THE BRITISH JOURNAL

OF

TUBERCULOSIS

Vol. VII. July, 1913. No. 3.

THE DOMICILIARY MANAGEMENT OF CONSUMPTIVES.

By THOMAS SPEES CARRINGTON,

M.D.,

Assistant Secretary of the National Association for the Study and Prevention of Tuberculosis; author of "Tuberculosis Hospital and Sanatorium Construction"; and "Fresh Air and How to Use It."

Pulmonary tuberculosis may be cured at home in many instances if the disease is recognized early, and proper means are taken for its treatment. When a member of a family is found to have consumption and cannot be sent to a sanatorium, arrangements for home management should be made as soon as possible.

It is all important in the treatment of tuberculosis to breathe air that is fresh and pure. This means that as many hours of the day and the night as possible should be spent in the open air. In order to accomplish this some suitable place must be provided, one which is not only protected from wind, but also from rain and snow. Nothing except the most severe cold should prevent a patient from living and sleeping out of doors. The outdoor shelter should be large enough to contain a bed, a reclining chair, and a table, and should, if possible, be placed in pleasant and sanitary surroundings, as it will very likely have to be the home of the patient for months, and better results will be obtained if it is comfortable and attractive.

Persons living in large cities should make every effort to provide open-air treatment for any member of the family who contracts tuberculosis. When the use of a flat roof on which to place a shelter or a porch cannot be obtained, a window opening on to a street or a large court should be set apart for the patient, the head of the bed

placed beside the window and covered with a window tent. A temporary home-made window tent which gives excellent results can be made with two bed sheets, each 9 feet long by 4 feet wide. Tack one end of each sheet to the top of the inner window casing, overlapping them 18 inches where they meet at the middle of the window. Carry the lower ends of the sheets to the outer side rail of the bed, allowing them to fall over the edge of the bed, and attach them by strong tape to screw-eyes inserted into the floor. Then tack the outer

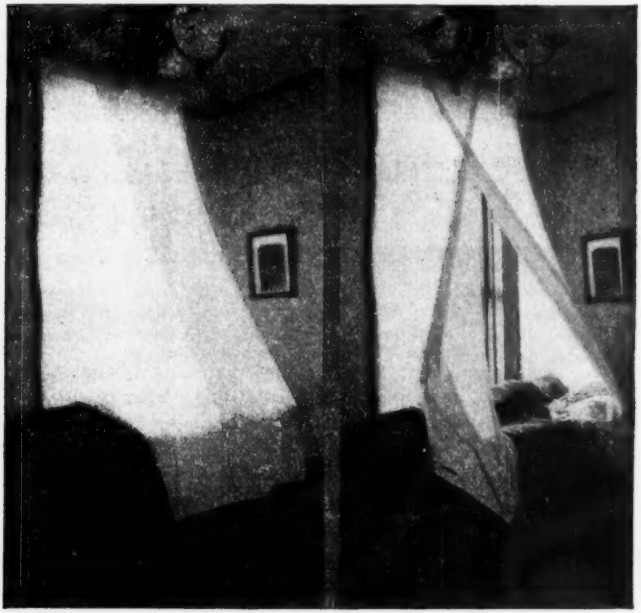


FIG. I.—A HOME-MADE WINDOW TENT.

This consists of two sheets, 9 feet by 4 feet wide, tacked to the window casing and fastened by tapes at their lower ends to screw-eyes fixed in the floor.

sides of the sheets to the outer edge of the inner window casing. The sheets making the window tent should not be pinned or attached in any way to the bedstead or bedding, as it is necessary that the bed covering be allowed to move freely with the sleeper, under the edge of the tent. If desired, any heavy cloth, such as canvas or unbleached muslin, can be used instead of the sheets, and, with the help of the illustration, a tent can be arranged over any bed near a window in a few moments. If the home-made tent proves satisfactory, a stronger and more convenient manufactured tent may be purchased (Fig. 1).

Window tents are all constructed practically on the same principle, the difference between them being largely in their shape and the manner of their manipulation. A frame, usually of steel, supports a canvas cover, and this canopy encloses a space inside the room connected with the window. The tent frame is either attached to the window casing or the head of the bed, and projects over the bed, covering the head and shoulders of the person lying on it. When purchasing a window tent one should remember that its purpose is to supply fresh outdoor air to a sleeper indoors without making the bedroom uncomfortably cold; and as it is a device to supply fresh air,

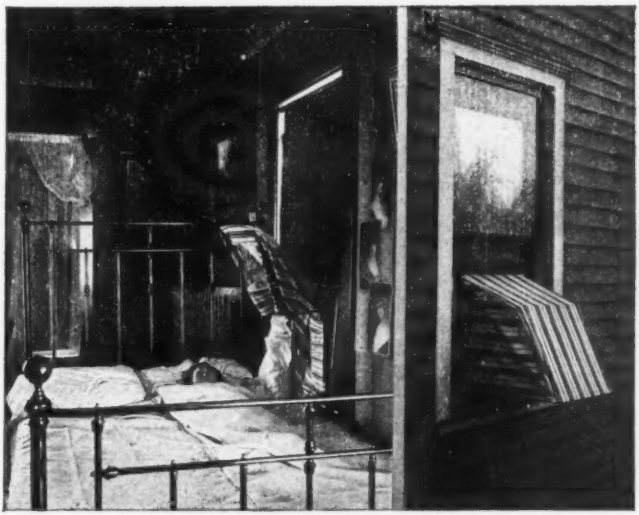


FIG. 2.—THE WALSH WINDOW TENT.

These illustrations indicate the window tent raised when not in use, and also when the tent is in use with the outside awning completely lowered.

it should be made so that the ventilation within it is perfect. Window tents should be inconspicuous from the exterior of the house, and arranged so that they can be moved easily and placed in position without great difficulty. They should fold neatly against every part of the window, and when not in use swing out of the way so as to permit the usual amount of light and air to enter the room. Shields should be provided with all tents to screen the occupant from storms as well as to protect him from being overlooked from neighbouring windows, and the cover should be detachable so that it can be laundered (Fig. 2).

It is quite possible to sleep in comfort with one's head outside the

window. In order to do this the head of a cot bedstead may be run through the window so that the sleeper's head and shoulders are on the outside. The lower window sash must be raised about 2 feet, and a heavy cloth or curtain hung from its lower edge, which will drop across the body and shut off the room from the outside air. In very severe weather the curtain can be tucked around the sleeper's neck, leaving his body practically indoors and in a warm room. In warm weather

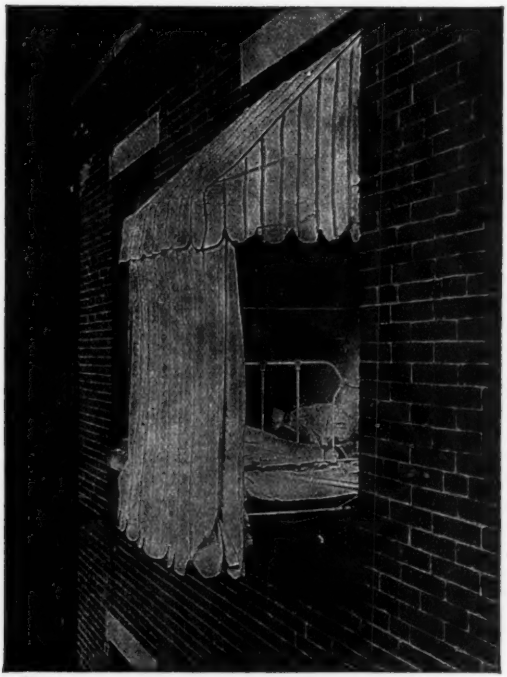


FIG. 3.—OUTDOOR SLEEPING.

The outside window awning protects the patient, who is lying in bed with head on the upper part of bedstead projecting through the open window.

the curtain can be drawn down toward the feet, in this way placing the body practically outdoors. The head of the sleeper on the outside of the window should be protected by a canvas awning supported on a wooden or steel frame. The ordinary awning for shielding windows during the summer months may be used for this purpose, or a home-made shelter can be constructed with a wooden frame covered with canvas. For summer, a Venetian blind awning made of wooden slats may

be used and is to be recommended, as it can be arranged so as to obtain a free current of air without losing the necessary protection (Fig. 3).

The flat roofs of houses in large cities should be used as breathing places by the tenants, and shacks or cabins built upon them make economical and easily provided shelters for tuberculosis patients. A

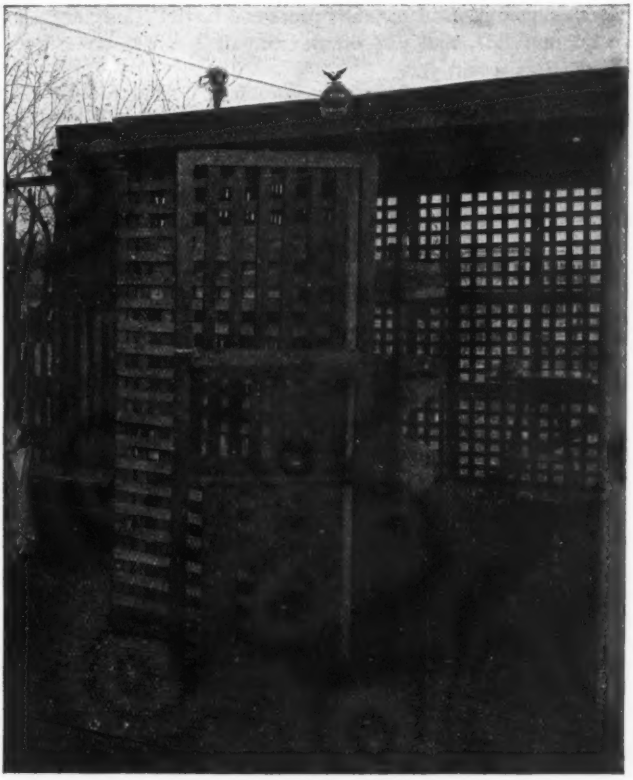


FIG. 4.—AN INEXPENSIVE ROOF SHELTER.

This cheap form of roof shelter is made of latticework nailed to a wooden framework.

roof should be viewed with the idea of selecting the best position for a shelter. A little consideration will show that there are various conditions to be met on the top of all buildings, such as a choice of the best exposure for the open front of a small building, the most protected place, and one which will afford some means of anchorage, so that the shelter will be safe during severe storms. In many buildings the main

stairway ends in a small superstructure on the roof. These additions, high cornices, and wide chimneys can sometimes be used as wind-breaks in winter and for partial shade in summer. Where buildings are high and the roofs are above surrounding structures, a shelter must be carefully anchored in order to stand against the wind. The roof of an extension in the rear of a building often makes an excellent site for a shelter, as such roofs are usually protected by the main portion of the house on one side, and are often more or less sheltered by other buildings (Figs. 4 and 5).

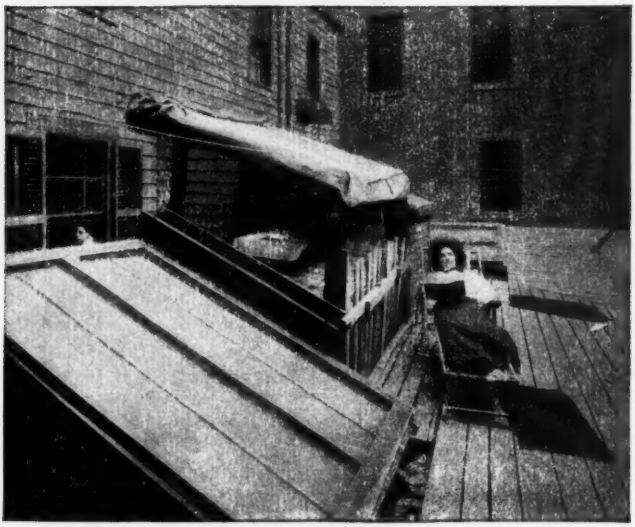


FIG. 5.—A ROOF SHELTER.

This is a form of inexpensive shelter constructed of wood and canvas, and is erected on the roof of a tenement house.

A roof shelter can be constructed of wood, brick, tile, reinforced concrete, or with a wooden frame covered with sheets of iron, tin, or roofing paper. It should be about 10 feet wide by 12 feet deep, and if it is to be a temporary structure, it is advisable to use a wooden frame as a foundation so that it can then be moved and its position and exposure changed. The foundation frame should be made of 2-inch by 6-inch plank laid flat on the roof, and mortised at the corners. The front of the shelter should face slightly to the east of south, and be left open, but arranged with a canvas curtain tacked on a roller, so that it can be closed in stormy weather. A shack of this kind can be built very cheaply of rough boards, and the roof covered with tar paper

or other roofing material. When it is impossible to use the roof of a city home as a site for an open-air shelter, an iron frame porch or a wall-house opening out from one of the bedrooms is sometimes erected.

In choosing a suitable position for a fresh-air bedroom, it should be remembered that early morning sounds and sunlight are to be eliminated if possible. This can usually be done by selecting a place as far from the street as possible, and by shading the bed with blinds. One's

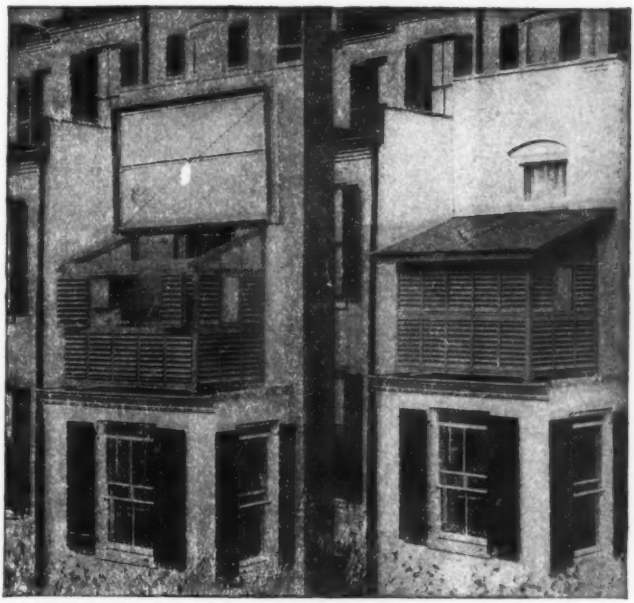


FIG. 6.—THE WALL HOUSE, "STARNOOK."

The figure to the left shows the "Starnook" with the roof raised and the shelters open to obtain sunlight, while the figure on right shows the house closed for outdoor sleeping at night. (By courtesy of Dr. S. A. Knopf.)

neighbours should be taken into consideration, and a position decided upon which does not overlook their windows, porches, or yards. Many city buildings have angles, corners, and courts, making breaks in the outer walls which give protection against the direct rays of the sun in summer and heavy winds in the colder seasons. A little study will quickly show the position which is most advantageous. Sometimes new doors or windows will be needed to give access to a desired position on the outside of the building. Frames and wall-houses can usually b

secured with safety to the walls of buildings at any height, and when strongly supported, there need be no fear in regard to their stability.

The wall-house shown in the accompanying illustration (Fig. 6) can be used in any of these positions, and may be supported by the roof of an extension, columns, or on brackets attached to the walls of the

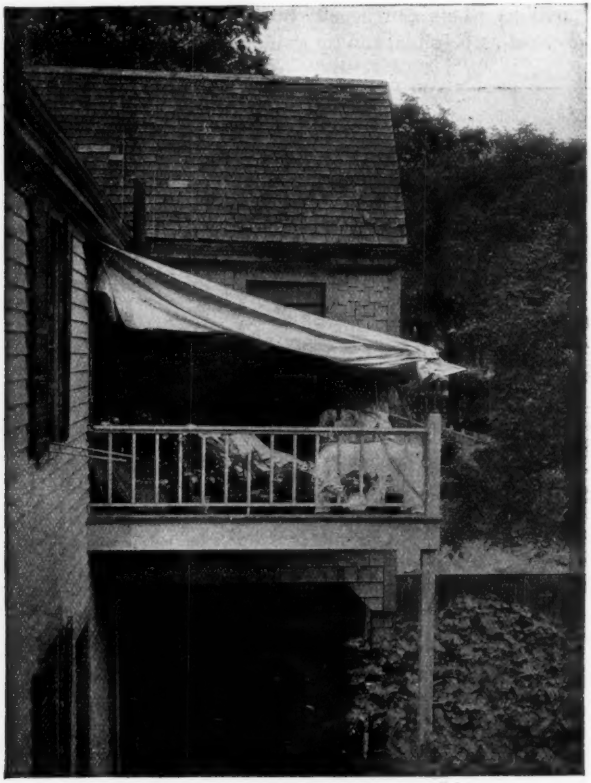


FIG. 7.—A TEMPORARY FRESH-AIR PORCH.

A well-constructed wooden porch for use in moderate weather. It is protected by an angle of the house, and is supported by a 4-inch post.

building. This fresh-air room consists of a roof, floor, and three walls, and, with the exception of the roof and floor, is built of steel frames holding movable shutters. The apartment is 9 feet long by 6 feet deep, and the roof is 8 feet high at the inner side, with a fall of 2 feet. At both ends are windows which can be opened outward. A frame filled with glass closes the triangular spaces at the ends under the

sloping roof, but there is a narrow space between the top of the walls and the roof, which is left open to allow for the circulation of air. The roof can be raised entirely off the apartment by means of a crank and counterweights, and the three upper sections of the front shutters can be opened or closed.

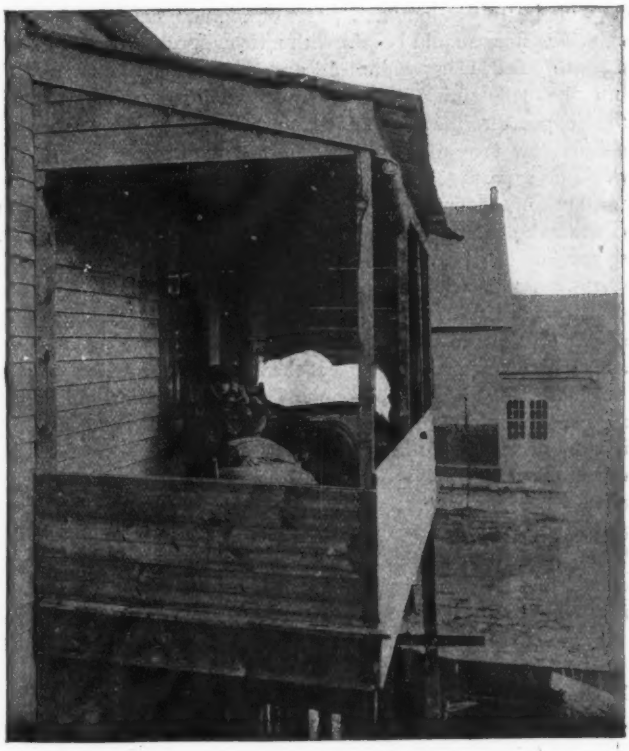


FIG. 8.—AN OPEN-AIR PORCH.

One of the porches used by working men's families in Troy, N.Y., for open-air sleeping.

In a small town or in the country, it will usually be found that a wooden porch is the most convenient way of providing fresh-air quarters. In selecting a situation for a sleeping or sitting-out porch, it is well to remember that it should be placed in a sheltered position, and the most important point is to find a spot protected from prevailing winds.

If a porch for winter use is to be built, it should, if possible, be

placed on the south side of the house in order to receive the greatest amount of sunshine. In summer this position is usually very hot, and it will be found that in most climates an east or west exposure for a porch to be used during the entire year gives the best satisfaction (Fig. 7).

A porch to be comfortable should be rather large; a good size being 10 feet wide by 10 feet long and 7 feet or more in height from floor to ceiling. The floor should be laid with narrow spruce boards at a grade of 1 inch to 5 feet, using white lead and oil to fill in the cracks. The roof may be made with boards covered with tin or roofing paper, the end most exposed to the wind and rain protected by glass and sash, and the sides below the railing tightly boarded to prevent draughts from below. For a passage-way to the porch, cut a window down to the floor and put in a door 3 feet 6 inches wide, so that a 3-foot bed can be rolled from the interior of the house to the porch without difficulty. These porches can be supported from the ground on long 4 by 4-inch posts, or built on brackets bolted to the side of the house (Fig. 8).

Many porches, used both for sitting-out and sleeping purposes, have been built on the roofs of first story extensions or verandas. When such means of support are utilized, the roofing over which the porch will rest need not be removed or damaged, as a permanent floor laid on joists can be built at a proper level by supporting the beams at the inner end by the wall of the house and at the outer end by the edge of the veranda. If a porch is fairly deep and sheltered on two sides by an angle of the house, sufficient protection for moderately cold weather can usually be obtained by canvas curtains. Where the porch stands out from the house, one or both sides should be protected with sash and glass, and the front with a canvas curtain. These curtains are usually made of heavy duck, and can be arranged and controlled in various ways. In putting them up it should be remembered that they are intended to keep out strong winds, rain, and snow, and so must be firmly fixed when in place for protection. A simple way of arranging them is to bind the edges of the canvas after cutting it into the required size for the curtain, then tack the upper edge of the curtain to the inside of the roof plate, and reinforce the tacks by a piece of lath or narrow strip of board nailed over the canvas and row of tacks. To the bottom of the curtain should be attached a wooden roller about 1 inch in diameter. The curtain can then be rolled up out of the way by ropes run through pulleys attached to the roof plate. Screw-eyes should be inserted into the floor below the roller and at intervals in the posts at the sides of the curtain, so that the canvas can be tied tightly with tapes during windy weather. Carriage curtain tongues and buckles, or buttons and eyelets, are sometimes used instead of tapes (Fig. 9).

Clothing, particularly when intended for open-air life, must give proper protection to the body against the wind, and be of such material and colour as will best hold the air over the surface of the skin at a uniform temperature. The various garments should interfere as little as possible with the function of the skin, and should not have an irritating effect upon it, nor produce injurious pressure on any part of the body. Children should be clothed in woollen materials, and their legs,

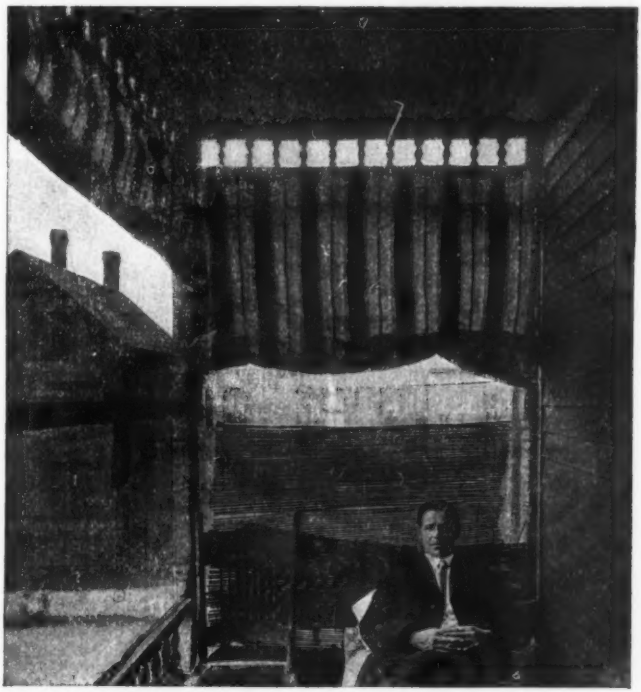


FIG. 9.—A PROTECTED SLEEPING-PORCH.

This protected sleeping-porch has a canvas screen which can be raised or lowered as desired. A wooden roller is tacked to the bottom of the curtain.

arms, neck, and chest as well protected as other parts of the body, for they lose heat rapidly and are easily chilled. The clothing selected for protection when sitting in a reclining chair out of doors should be of light weight but warm. For winter weather, medium weight underclothes of wool or linen mesh should be worn next to the skin, and over these a sweater which buttons in front. The ordinary weight street clothing, covered by a fur coat, complete the outfit. A fur coat is a

necessity, as even the cheapest of skins is the warmest material obtainable for an outer garment. A canvas coat lined with sheepskin gives good protection. The sleeves of a fur coat should be lined with fur and closed at the bottom with an elastic string. Leather leggings and woollen tights may be used as extra garments, and are a great comfort

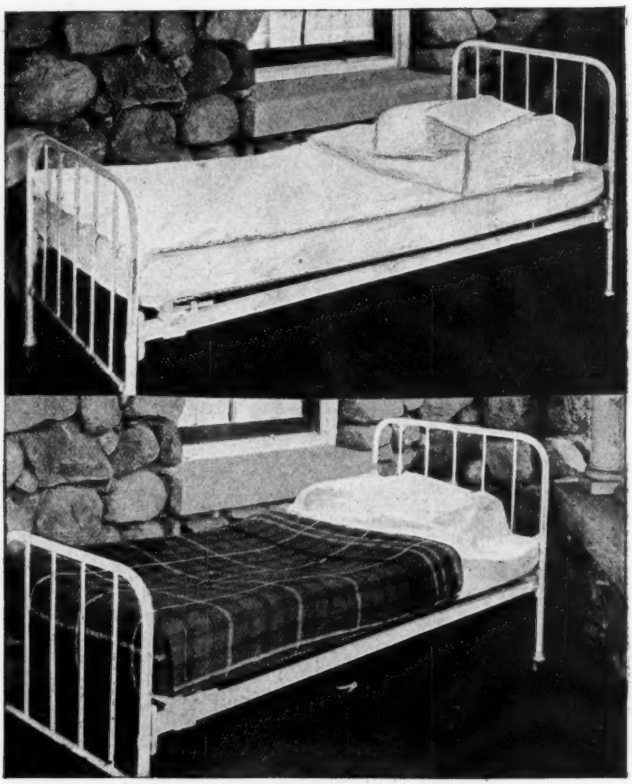


FIG. 10.—THE KLONDIKE BED.

To make a sleeping-bag with bedclothes, first tuck all the covers except the outside blanket under a bed-pad, and then tuck the top cover under the mattress.

when taking exercise on cold days. Leather coats are suitable for very cold and stormy weather, as the wind cannot penetrate through them. In very cold weather and on windy days extra wraps should always be at hand for the use of those sitting out of doors. The chair should be placed in a sheltered position out of the wind, and care taken to wrap up warmly.

An ordinary iron bedstead, 3 feet 6 inches wide, with a woven wire spring and a moderately thick mattress, are generally used for outdoor sleeping. The bedstead should be fitted with small rubber-tyred wheels or large castors so that it can be rolled about easily. A good hair mattress is most desirable, but when it cannot be obtained a vegetable-fibre mattress with a cotton-wool top or a cotton-wool mattress can be used. When sleeping out in very cold countries two mattresses with several layers of newspaper between them should be used to prevent the heat of the body from escaping below. Persons who like heavy bed-covering may use blankets, placing as many layers over the bed as desired for warmth. Those who cannot stand heavy covering can use down, lamb's-wool, or cotton-filled comforts, which are very warm but light. These can be purchased, or the material for wool or cotton wool comforts obtained, and warm, satisfactory covering made in the home.

There is a method of arranging the bed-covers to form a sleeping-bag called the "Klondike bed," into which a person can slide from the upper end, the idea being to keep the cold air and wind from getting under the blankets. To make the Klondike bed, place over the mattress an old blanket or a cotton-wool bed-pad of the same width as the mattress, and on this ordinary bed sheets or blanket sheets. Make the bed in the usual way, allowing its covers to fall loose on every side. Then gather up the coverings on one side and pass them beneath the pad to the centre of the bed, and follow this by doing the same on the opposite side and at the foot of the bed. The entire bed is last covered by a heavy blanket or quilt which is tucked in under the mattress (Fig. 10).

Another method of making a sleeping-bag from bed clothing is to place two heavy blankets, one on top of the other, full width across the mattress with half of each blanket extending over the opposite sides of the bed on to the floor. On the top of the blankets, resting on the bed, lay lengthwise a thin, washable, double blanket as a bed sheet. Cover this with two or three heavy double blankets also lengthwise, allowing sufficient material at the bottom to tuck in well. Then fold over the bed the flaps of the two blankets placed crosswise, and tuck in at the opposite sides. A bed made in this way cannot be easily disarranged, but must be entered by sliding in at the top.

FACTORS IN THE ANTI-TUBERCULOSIS CAMPAIGN.*

By T. D. LISTER,

M.D., M.R.C.P.,

Physician to Mount Vernon Hospital for Consumption, and to the Waterloo Road Hospital for Women and Children.

Tuberculosis is a disease which has attracted the attention of the Governments of every civilized country. The literature of the subject is immense, and is continually being poured forth. If I were asked to say what is the most significant fact which evolves from these studies, I should answer, the apparent universality of the disease in the modern civilized community. This is not a new fact, but a great deal of the most modern work tends more and more to the confirmation of the view so long held, that practically no one escapes infection by the tubercle bacillus. The importance of these facts in regard to the future of State campaigns against tuberculosis I will deal with immediately. Meanwhile would like to be allowed to review briefly the evidence upon which the statement is based, that practically every dweller in a civilized community has tuberculosis somewhere in his body. In the earlier days of the study of this disease, the evidence as to its prevalence was largely obtained by the examination of the bodies of those dying from old age, from accident, and from diseases other than tuberculosis. So long ago as 1838, over forty years before the discovery of the germ of the disease, Carswell wrote: "Pathological anatomy has never, perhaps, given a more decided proof of the cure of disease than it gives in cases of pulmonary tuberculosis." Guillot found cured tuberculosis in 60 per cent. of old people examined. Letulle and Ribard obtained similar results. Brouardel, in examining bodies at the Morgue in Paris, found 50 per cent. of the cases showed evidences of healed tuberculosis. Indeed, Nägeli of Zurich alleges that, in men over thirty years of age, he had found none absolutely free from signs of tuberculous infection. Professor Osler, in quoting these and similar figures said: "Large as these figures appear, they are not, probably, incorrect." "If, as has been done in Ribbert's laboratory, a systematic inspection is made for the purpose, tuberculosis lesions are

* Abstract of an address delivered at the annual meeting of the Metropolitan Hospital Saturday Fund, in the Mansion House, London, April 19, 1913.

found in practically 100 per cent. of the bodies of adults." These assertions were quoted by the late Dr. Bulstrode in his report to the Local Government Board in 1908.

General Infection and a Reduced Death-Rate.

I would like to point out that there is a certain deduction which must arise from the fact that everybody has or has had tuberculosis. It becomes the most hopeful thing in the outlook. For if everyone has had the disease, even if 10 per cent. of the population die of it, yet nine-tenths of the population get well of it. Attention should be directed to another great fact in regard to consumption in civilized countries. In all civilized countries having a large urbanized industrial population, the death-rate from consumption is continually falling. Many explanations have been given of this fact. The death-rate in our great cities has fallen 40 per cent. in the last twenty years. The first consideration I wish to emphasize is this association of the reduction in death-rate with the evidence that practically the whole population is infected by tubercle.

At what time of life does this tuberculous infection occur first of all in the lifetime of the individual? We cannot take people to pieces during life on any large scale, for the sake of gratifying our curiosity. But there are other ways of arriving at a definite knowledge of the proportion of living people who are already infected with tuberculosis. These are by applying to the body various tests, derived from the poisons of the tubercle bacillus. These tests are applied by vaccination or inoculation methods. It is a very remarkable thing that, wherever these tests have been applied on a large scale, they have confirmed very fully the views expressed by those who had actually examined the bodies of people dying from all kinds of diseases. Tuberculin tests are applied by vaccination and inoculation. They do not act on people who have no tuberculosis in their bodies, and are harmless in expert hands. In the vaccination tests a drop of tuberculin is rubbed into the skin, and a drop of some inert substance, such as glycerine, is also rubbed into the skin close by. Within a few hours, if the person be the subject of tuberculosis, the mark made with the glycerine may show a little irritation from the fact of the rubbing, but this passes off very quickly. The tuberculin mark is much more developed, and persists for a week or ten days, when it gradually fades. Of children tested by this method by Von Pirquet, its inventor, 55 per cent. give a positive reaction.

The inoculation test is carried out by injecting through a hollow needle a minute drop of the tuberculin under the skin. Should the patient be tuberculous, the effect of the injection is to cause a local

swelling at the point of inoculation, or a rise of temperature. This was applied by Hamburger to children who did not show signs of tuberculosis by the vaccination test, and it was found by inoculation that, at twelve to thirteen years of age, no less than 95 per cent. of the children are already infected by tuberculosis. This enormous percentage strongly supports the view formed by the examination of the body itself after death, that the whole population has tuberculosis.

To be infected by a disease germ, however, is a very different thing to being killed by the disease. In fact, it may be an advantage to be infected.

Who are they who die of Consumption?

The figures quoted are derived, not from the deaths from tuberculosis on the one hand, nor from the people suffering from tuberculosis on the other hand. They are studies made of people who as a rule presented no signs of tuberculosis during life. Now let us come to the consideration of the actual deaths that occur from consumption. On whom does the mortality of consumption fall? Consumption as a cause of death is a special disease of the industrial classes in our great cities. It is not a disease of the young any more than of the old. The death-rate from consumption of those living at the age of sixty is the same as the death-rate of those living at the age of twenty, a fact which is often overlooked, not only by the public, but even by medical writers on the subject. It is a little higher in the middle period of the working years of life, say at forty years of age. Studies of the mortality of the whole occupied male population, and of the special industries, prove most conclusively, wherever the figures are examined, the truth of this assertion.

In a paper which I read at Brussels in 1910 at the International Congress on Industrial Diseases, I showed by a rearrangement and comparison of the mass of figures, given in our English occupational mortality statistics, that the occurrence of deaths from consumption depended largely upon certain conditions under which labour is carried on, people are housed, food is supplied, and regularity of employment is obtained. Deaths from consumption seem also to be associated closely with drunkenness. Anyone who has worked at the subject as a scientific sociologist, even if one approaches it only from the medical side, must be convinced that drunkenness as well as consumption are among the effects of poverty, bad housing, and casual employment. But, however that may be, there is strong evidence that not only do drunkenness and consumption exist side by side in certain classes of the community, but that consumption depends upon the loss of strength to resist disease, which comes from the abuse of alcohol. Apart from poverty, bad housing, and casual employment, there are certain occupa-

tions in which the use of alcohol is an unfortunate custom. These also show a high death-rate from consumption, which is not due to the conditions in which they live. Industrial consumption as a cause of death stands on a tripod which may be defined as consisting of bad food, bad housing, and bad habits. I do not say that these three factors are equally powerful, nor do I exclude other occasional factors.

Of the 47,000 deaths which occurred from consumption among occupied males, aged twenty-five to sixty-five, in the three years 1900 to 1902, nearly 6,000 occurred among transport workers, nearly 5,000 occurred among the metal workers, nearly 6,000 in the building trades, over 6,000 among the general labourers, nearly 1,700 among clerks, 2,400 among agriculturists, nearly 1,800 in the textile industries, 1,700 among miners, and the remainder in smaller groups amongst the smaller industries. Twenty-three thousand occurred in four great industries. Those who wish to feast on figures may turn to the supplement of the sixty-fifth report of the Registrar-General. If the investigator will arrange the figures on some such analytical lines as I did for Brussels, he will find certain truths emerge, which can be confirmed again and again by every test that he likes to apply. Where the man is engaged in work among poisonous metals—for instance, copper, zinc, tin, and lead—he has a greater chance of dying of consumption than if working in the metals or minerals which are normally found in the human body in chemical combination. Iron-workers have less risk from phthisis than brass-finishers. Indoor occupations have a greater death-rate in the same classes of the community—for instance, shopkeepers. Drapers suffer much more than greengrocers. Town dwellers have a much greater mortality than those living in the country. Proper regulation in regard to an employment produces very important results. The coal-miner has less than half the risk of dying from consumption of the commercial clerk or warehouseman. Indeed, so marked is the effect of the regulations under which coal-miners work that they are as little liable to consumption as those who, like the agriculturists, work in the fresh air and sunshine. Many other striking comparisons can be made. They have an important bearing on the question that I propose to put to you presently. Let us place this evidence of the manner in which the actual death-rates from consumption are affected by environment in relation to the facts of the universality of the disease and the falling death-rate.

If, among those who for the purposes of civilization are forced into the cities from the land, it is true that they are infected by tubercle in childhood, and yet nine-tenths of them recover from the infection, there must be very powerful causes acting against those who form the tenth who die. It is a study of the comparative mortality of industrial consumption that will afford the clue to these causes. One of the ques-

tions that arises is this: Would this tenth have died if they had been able to live under better conditions?

In 1903 the late Mr. W.G. Bunn initiated the movement which, with the assistance of the Princess Christian, Mr. William West, and others, resulted in the establishment of the Benenden Sanatorium. It was in some measure due to observations made in my Mount Vernon hospital work, and to studies of mortality statistics, that I came to the conclusion that the sanatorium itself only presents the direct opposite to those conditions which produce a high death-rate from consumption. I thought that if the agricultural labourer and the farm hand have such a low death-rate from consumption, and the industrial workers herded in cities have such a comparatively high death-rate, that it was simply necessary to give the latter class the same surroundings as the former when they became the victims of the disease. I thought no special advantages of site or soil were necessary, although at that time land was being bought for sanatoria with special references to pine-trees, sand, and gravel. I have never had any illusions as to the sanatorium being more than a means of arresting disease, a training-school in health, and an object-lesson to the community. The principles upon which the Benenden scheme was carried out were initiated in close assistance with the work of the Hospital Saturday Fund. Those principles are now the commonly accepted views of health authorities.

Could people continue to live and work under sanatorium conditions, the resistance that they would acquire to the disease would be similar to that enjoyed by those who recover from infection in childhood. Owing to certain disabilities of industrial life and town dwelling, loss of resistance is produced.

Why do others recover?

Broadly, what happens in our bodies is this, that the tiny forms of life which we call "microbes" obtain a foothold in our body, and, if they are not rapidly destroyed by the cells and our blood and tissues, they multiply and form poisons. As a result of this process various gross changes are produced; for instance, the lung may become solid, as in pneumonia, or boils may develop on the surface of the body. At the same time pain or fever, or some other disturbance of the system, is produced by the poison of the germs. Why does this process ever stop? Two things happen: firstly, the development of chemical substances which are opposed to the poison and to the germs themselves; and secondly, the destruction of the germs. Death may happen too soon for the body to overcome the invasion. The body is very like a civilized State; it has its ruling forces, its food-supply, and its defensive armaments. If the governing forces and the supply of necessaries and defensive forces are well co-ordinated, the body is strong to resist dis-

ease. In the case of consumption we have to deal with a microbe whose powers of colonization in an unfriendly territory are extremely patient, enduring, and determined. The tubercle bacillus may wait for years entrenched in a corner of the body, apparently asleep, but ever watching for an opportunity. That opportunity can be afforded by careless rule, failure in supplies, and a weakened defence. When or where that happens the invader can gain new ground, and, if it persists, eventually conquer and reduce to nothingness the vital resistance of the body. That is a fanciful summary of the modern views of the manner in which recovery or death from disease may occur. There is another possibility: Although entrenched in his own position, safe from attack by the defending forces, the enemy may be unable to advance because the country is rendered untenable in front of him. In this way the body may be kept in a condition of resistance to a microbe already in partial occupation.

Deaths occur from infectious disease because resistance fails. Disease of such a chronic nature as tuberculosis may remain latent for years without resistance failing, but resistance may fail at any time from loss of control, nutrition, or healthy surroundings. If we accept the views I now present, we have arrived at a general statement which is at any rate worthy of consideration. Tuberculosis is a disease of urbanized populations, infecting them early in childhood, producing death in one-tenth of the population in whom resistance is lost from ascertainable causes, but unable to kill in the remaining nine-tenths in whom resistance continues. This persistent resistance occurring in the majority of people who have latent tuberculosis in their bodies must be associated with a change in their constitution, resulting from the infection they received in childhood. This change is the one which I described figuratively as keeping the country untenable in front of an enemy who could not be dislodged. Doctors call it "acquired immunity."

The State as a Patient.

What I am endeavouring to lead you to is a conception of tuberculosis as a disease which remains latent in the social organism, as it does in the individual organism. Gathering people together in towns as we have done under the development of modern industry, we have exposed populations, formerly living a life of open freedom and elbow-room, to infection and a life of close confinement and overcrowding. Infection by a bacillus which above all things is fond of town life caused the striking death-rate from consumption which attracted the attention of our grandfathers and great-grandfathers during the last century. That death-rate has steadily fallen with the increase in our knowledge of the frequency with which infection occurs. Has not the

town dweller become gradually resistant to the new conditions that he had to face when he ceased to live in the country? Is not the very fact of the generalization of infection by tubercle leading to a gradual production of increasing resistance on the part of populations which are becoming increasingly urbanized. In other words, the civilized State is rapidly recovering from its attack of consumption brought on by its own acts. It has acquired immunity.

The suggestion that I make is that it is not by labelling people as consumptive, shrinking from them as in less enlightened days people did from the leper, taking dying people from their homes to consumptive prisons merely because of their infectiousness, but it is by carrying the lesson of the sanatorium, as a contrast to all that is foul, into the home-life of those among whom consumption finds its dwelling-place, that greater progress will be made. Nature, I suggest, is doing her part in stamping out consumption. She is not doing it by preventing infection, she is doing it by the creation of resistance of a special kind adapted for the purpose—a resistance due to infection. It is where her laws are broken, where our artificial conditions deny her active, healthy human material with which to work, that the deaths from consumption occur. It is not by creating and maintaining innumerable artificial devices that we shall conquer this disease, but by helping forward the natural process of recovery, the establishment of lasting resistance. A knowledge of how to live, a living wage, and a healthy home to live in, will do more than the regulations of technical experts.

A new conception of the manner in which disease follows the changes in human habits and human needs, resulting from so-called "progress," is dawning among certain advanced thinkers. Professor Karl Pearson in this country in 1911, Professor Sanarelli at the Rome Tuberculosis Congress last year, are among these. We have grown towns like mushrooms during the last hundred years. Things have come close to us, and sometimes, I think, obscured our clearer vision. Some of Nature's secrets are wrested from her painfully and laboriously in the laboratory and in the study. We may be certain that Nature's methods do not alter. It is when we attempt to gather a meaning from those laws which we know as yet, which form such a small part of the whole, that we are liable to mislead ourselves as well as others. It is in that spirit of self-criticism, and without dogmatism, that I venture to bring before you the considerations I have stated.

What about the Individual Sufferers?

The closer and more intimate question is that of the treatment of those actually suffering from the disease. First of all, are they a danger to the community? Undoubtedly they are if their disease is in such an active condition that they are discharging living tubercle bacilli

every time they cough, and if those round them are unprotected by proper conditions to enable them to resist infection. In the hospital and in the sanatorium there are many healed consumptives engaged in the actual treatment of the consumptive sick, exposed continually to infection, who do not again become victims of the disease. Some of the best sanatoria in this country are managed by doctors who deliberately choose to live among consumptives in a sanatorium, handling them, talking to them, exposed to infection all day long, *because* they have themselves had consumption in an open, revealed form. The consumptive doctor knows that under sanatorium conditions he can retain his resistance to the disease. There are thousands of consumptives among the population, who are scattering tubercle bacilli everywhere, although not sufficiently ill to consider that they need medical care. I know of two such cases where men have continued to earn their living without any particular hardship, although always in an infectious condition, for thirteen and twenty-one years. The prevention of infection by isolating every case of open consumption presupposes a surrender of freedom on the part of a well-recognized class, the consumption-carriers. These people are not ill, and are only recognized, in all probability, in a very small proportion of their number. They form a danger to the weakly, and by that I mean the non-resistant, that regulations cannot overcome, except by a reversion to such ancient laws as were enforced against leprosy. From the view I have just brought before your notice in regard to the cause of the fall in the death-rate of consumption, it is possible that these people, who carelessly distribute the seeds of disease, in reality scatter seeds of kindness. Do not take this remark too literally!

The Value and Limitations of Institutions.

Where the evils exist which cause loss of resistance, there is an additional reason for removing infectious advanced cases to institutions specially provided for the purpose. Such removals should be considered not only from the point of view of the safety of their friends, but also from the point of view of giving the dying the care and attention impossible in the homes that we, as organized society, have given them to live in. What I say is that it is putting the cart before the horse to try to stamp out infection in a disease so generalized as tuberculosis, while we continue to keep an untrained, unprotected, half-fed class of non-resistant weaklings. The tuberculosis dispensary as a centre of instruction, as a lighthouse of hygiene, should be provided with the means of carrying knowledge into the homes, such as they are, of those unable to withstand consumption. It should give them help, it should work with the sanitary authorities in letting air and sunshine into their dismal dwellings.

"The consumptive houses" in which people go to live and become infected, whose existence has been beautifully demonstrated by Sir Robert Phillip of Edinburgh, should be destroyed for two reasons. Firstly, such houses are frequently insanitary on many grounds. They are often the refuge of those whose lack of means renders resistance impossible of attainment. Secondly, as nests of bacilli they convey large doses of infection to their non-resistant inhabitants.

A second great use of the tuberculosis dispensary is that of reaching the various classes of disease and sorting them out for appropriate treatment. Without their first function, that of acting as centres of instruction, they cannot hope to catch a large number of cases in the earliest stages. Early application for treatment implies knowledge. From what I have said, you will have gathered that nowadays we are curing a great number of cases that formerly got well without treatment. But I think also we are curing a great number of cases that without our help would have utterly lost their resistance. The tuberculosis dispensary used intelligently will form a net to catch a considerable number of the latter class. It will send those, in whom it is believed that resistance can be regained, to the sanatorium; it will enable those too ill for the sanatorium to receive appropriate treatment at home or in the hospital; it will distribute the means of protection and disinfection to those watching the death-bed of the advanced case, and it will provide some of these dying people with gentle and kindly care in special institutions until the end.

HILUS TUBERCULOSIS ("ROOT PHTHISIS").

By R. MURRAY LESLIE,

M.A., B.SC., M.D.,

Physician to the Royal Hospital for Diseases of the Chest, London; Physician to the Prince of Wales's General Hospital.

Introduction.

The region of the *hilus*, or root, of the lung has long been recognized as a common site of tuberculous deposit, more particularly in connection with the tracheo-bronchial lymphatic glands, but the immense importance of the hilus of the lung as an early and primary focus of pulmonary disease is only just beginning to be appreciated. The frequency with which the bronchial and mediastinal glands become affected may be readily understood when we recall the fact that these glands are the natural filters or sieves to which pass foreign particles, including tubercle bacilli, deposited on the tracheal and bronchial

mucous membranes or on the epithelial surface of the alveoli. These glands are, indeed, as Sir Douglas Powell well expresses it, "the dust-bins of the broncho-pulmonary tracts." The pleural lymphatics also drain into the glands at the root of the lung. The bronchial glands are also directly connected with the cervical and abdominal lymphatic systems, as has been definitely proved by Grober, Poirier,[1] and other observers.

In view of the above considerations, it is not surprising that the thoracic lymphatic glands should be frequently the seat of disease. So extraordinarily common, indeed, are tuberculous foci in the bronchial glands and surrounding lung-tissue, that the majority of all bodies examined post mortem, whatever the cause of death, present distinct evidence of old-standing or recent disease in these parts. Even when there are no tuberculous foci visible to the naked eye or on microscopic examination, the intra-peritoneal injection of the gland-tissue in guinea-pigs is usually followed by general tuberculosis. Naegeli found evidence of tuberculosis in no less than 97 per cent. of all adult post-mortem examinations, and in a large proportion of these the disease took the form of calcareous or caseous deposits in the glands situated either at the roots of the lungs or along the large air-tubes. The bronchial glands, indeed, are often the first tissues attacked by tuberculosis in early life, and may be the only foci of disease in the whole body.

Professor Nietner,[2] of Berlin, is of opinion that tuberculous deposit often commences in the second year of life, and continues in an increasing ratio up to and beyond the age of puberty. K. Preisich,[3] as the result of his investigations on the frequency of tuberculosis in childhood, makes the following statement, which indicates the importance of peribronchial and hilus tuberculosis in children: "In children over eight years of age chronic tuberculosis of the lungs tending to recovery is no longer rare. Most frequently there are found peribronchially disseminated, lobular or confluent foci. *There is also caseous infiltration starting from the hilus and spreading over an entire lobe* (probably *starting from the hilus glands and spreading back along the lymphatics*)."

In England the radiographic investigations of Dr. Alfred Jordan,[4] published under the title "Peri-bronchial Phthisis," have attracted widespread attention. He states that the great majority of a series of "healthy" lungs obtained by him from the post-mortem room and examined by the X rays showed calcareous deposits in the lymphatic glands, either at the roots or along the course of some of the larger air-

[1] Poirier: "Traité d'Anatomie Humaine," Paris, 1902.
[2] Nietner: *Lancet* November 16, 1912.
[3] Preisich: *Wiener Medizinische Wochenschrift*, 1911, Nos. 3 and 5.
[4] Jordan: *Practitioner*, February, 1912, and *British Medical Journal*, August, 1912.

tubes. On the other hand, Dr. Horton-Smith-Hartley[1] has recently stated that, whatever may be true of children, his pathological experience has shown that in the case of adults dying from chronic pulmonary tuberculosis caseation of the bronchial glands is the exception rather than the rule. In 263 post-mortem examinations which he has conducted at the Brompton Hospital, in only 9·1 per cent. were the bronchial glands found caseous. Dr. Hartley probably refers to readily visible gross changes, such as definite softening and enlargement. Careful dissection is often necessary to expose to view the smaller indurated, caseous or calcareous glands situated on the bronchi and below the tracheal bifurcation, where they are often concealed by the over-lying hilus tissue, though during life they may have stood out clearly in a radiogram as definite rounded dark shadows.

Fortunately, there is a marked tendency to spontaneous cure in the case of glandular tuberculosis, as is evidenced by the frequency with which such calcified bronchial glands are met with post mortem in cases where there had been no suspicion during life of any tuberculous disease. At the same time, it must not be forgotten that the disease may lie latent in the glands for long periods, and may be followed many years later by important and serious consequences.

As regards the incidence of the disease, evidence is accumulating that catarrh of the bronchial mucous membrane is one of the most important predisposing causal factors in connection with hilus tuberculosis. Sir William Osler in this way explains the frequent occurrence of tuberculosis *adenitis of the bronchial glands as a sequela of whooping-cough and measles.* Increased vulnerability of the tissue, according to the late Professor Virchow, is the important factor in producing the disease, and such vulnerability would naturally occur as the result of injury or breach of continuity in connection with the bronchial mucosa.

The Primary Site of Chronic Pulmonary Tuberculosis: Apex versus Hilus.

Hitherto the apex has always been regarded as the most frequent primary focus of pulmonary tuberculosis. In 1880 Sir James Kingston Fowler[2] stated that a spot situated 1 to 1½ inches below the actual apex was the primary seat of disease in the large majority of cases. This observer also drew attention to the fact that tuberculous disease in its progress through the lungs followed a distinct "line of march," particularly in the chronic and fibroid varieties, the disease spreading in each lobe from above downwards, hardly ever from below upwards. It must be admitted, however, that Fowler makes no attempt whatever to explain the rationale of the "line of march" which he so carefully

[1] Horton-Smith-Hartley: Trans. Roy. Soc. Med., vol. vi., No. 6, April, 1913.
[2] Fowler: "Localization of Lesions in Phthisis," 1880.

describes, and it would seem that a more or less constant "line of march" must have some rational explanation.

On the other hand, the view is now held by many, including the writer,[1] that the *hilus*, and not the apex, is in general the primary focus of disease—certainly in children, and probably also in adults. The strongest evidence has come from the radiographers.

Dr. Alfred Jordan[2] states categorically that *chronic pulmonary tuberculosis does not generally commence at the apex, but begins at the roots and extends along the branchings of the large bronchial tubes.* Dr. Jordan inclines to the view that the primary tuberculous deposit does not take place in the bronchial glands, but in the peribronchial tissues in the form of bronchopneumonic foci, and that the glandular enlargement is secondary. He believes that the tuberculous process generally spreads by bronchopneumonic extension in the peribronchial tissues, and that these deposits in favourable cases cicatrize into fibrous bands, appearing as dark, radiating shadows on X-ray examination of the affected lungs He further states that in advancing cases the disease, commencing as a definite peribronchial infiltration, spreads from the hilus in all directions, but most rapidly along the ascending and descending branches of the main bronchus, and that sooner or later the disease reaches the apex by way of the ascending bronchiole. When the apex is reached, the disease, he says, may there progress rapidly, so that the apex appears to be clinically the chief seat of invasion, the primary disease at the root being so deeply placed as to escape detection from without. He explains purely apical cases on the hypothesis that the tuberculous infection has travelled up from the hilus along the main ascending bronchiole to the apex in an early stage, and progressed there, while the track of infection from the root to the apex has healed up, leaving only an excess of fibrous tissue along the ascending bronchiole. Dr. Jordan bases his conclusions mainly on his interpretations of radiographic shadows in the lungs of living subjects, and of similar shadows obtained by the X-ray examinations of lungs taken from the post-mortem room.

Dr. Bythell[3] goes so far as to state that *in children pulmonary tuberculosis invariably starts at the roots of the lungs.* Out of 300 successive cases in children examined clinically and radiographically, he had never seen a single case in which the disease had not obviously originated at the hilus of the lung, nor met one in which the sole or even the primary lesion had been at the apex. Whenever there had been an apical lesion, there was in every case revealed by the X rays a far more advanced lesion at the root of the lung, which had escaped

[1] Leslie: "Hilus Tuberculosis," *Clinical Journal*, January 22, 1913.
[2] Jordan: *Practitioner*, February, 1912, and *British Medical Journal*, August, 1912.
[3] Bythell: Proc. Roy. Soc. Med., vol. vi., No. 5, pp. 77 and 92, March 13, 1913.

detection by the ordinary clinical methods of examination, but which was clearly indicated by definite mottling and nodules in the region of the hilus.

Mode of Extension of Hilus Tuberculosis.

In a number of cases the infection seems to spread directly to the lungs from the caseous bronchial glands, often apparently by direct contact. Indeed, as Sir William Osler has pointed out, and his statement is confirmed by the writer's observations, it is sometimes difficult to determine in a section through the affected lung where the caseous bronchial glands terminate and where the pulmonary tissue begins. In the greater number of cases, however, the extension is probably by way of the lymphatic network surrounding the pulmonary vessels and bronchi.

Kingston Fowler[1] himself, in discussing the pathology of chronic fibroid phthisis, admits that the extension of the disease is more towards the peribronchial tissue than towards the alveoli, and states that the bronchi may be thickened from small-celled infiltration, while actual tubercles may be present both in the walls of the bronchi and in the peribronchial tissue, in which cases groups of granulations having a racemose arrangement are usually present. Fowler also found that the lining membranes of bronchi which pass through such tuberculous broncho-pneumonic areas are often intensely injected and swollen, and may even have undergone extensive tuberculous ulceration. He further found that tuberculous infiltration of the peribronchial sheath may lead to marked thickening of the tube and narrowing of its lumen. In some of these cases this fibrous constriction and narrowing of the bronchus may lead to bronchiectatic dilatation beyond the site of constriction.

Dr. Jordan's[2] views on the mode of extension of hilus tuberculosis are expressed in the following paragraph: "The first stage is catarrh of the air-tubes; this gives no X-ray evidence of its existence. The next stage is catarrhal broncho-pneumonia; in this stage the lumen of the air-tubes is found to contain catarrhal cells (epithelioid plates), while the tissue surrounding the bronchial cartilages is found infiltrated with leucocytes. This peribronchial small-cell infiltration gives rise to the X-ray mottling along the air-tubes which is the characteristic feature of peribronchial phthisis. The glandular involvement at the roots is a secondary change. The glandular enlargement is usually an early result."

Dr. Bythell,[3] on the other hand, supports the present author's views expressed in the *Clinical Journal* of January 22, 1913, respecting

[1] Fowler: "Diseases of the Lungs." Fowler and Godlee.
[2] Jordan: Proc. Roy. Soc. Med., vol. vi., Nos. 5 and 6, 1913.
[3] Bythell, *ibid.*

the hilus glands being themselves in many cases the direct or indirect origin of chronic pulmonary tuberculosis. It is the glands, he says, that are the actual danger spots. Dr. Bythell summarizes the present writer's views, which he strongly supports from his own personal experience, in regard to the primary glandular origin—direct or *indirect*—of chronic pulmonary tuberculosis and the mode of extension into the lung-tissue, in the following paragraph: "The lung may become infected either by the direct spread of the tubercular foci from the breaking down of the caseous glands, or by the bacilli being carried backwards along the lymphatics by what is known as the retro-impulsion of lymph, owing to the block that has taken place at the bronchial glands. Later, as the disease becomes more established, the apices may become infected either by this direct extension along the lymph channels, or as independent foci by one of the other methods, such as autogenous blood infection, aspiration broncho-pneumonia, or by bronchial embolism of infective particles detached from an open lesion."

The writer cannot accept in its entirety Dr. Jordan's view regarding the universality of peribronchial extension, and certainly not in the later stages of pulmonary tuberculosis, when we have to deal with an "open," and not a "closed," disease, and when there is accordingly a constant liability to such accidental contingencies as autogenous blood infection or bronchial embolism and aspiration broncho-pneumonia. In the "closed" stages, however, there seems little doubt that the extension does take place along the perivascular and peribronchial lymphatics. In the writer's opinion this occurs only to a limited extent and in the earliest stages as the *direct* result of primary bronchial infection, and then only in the form of small isolated deposits; though even a few such foci, however quickly they heal up, may serve to reinforce the virulent activity of the originally inspired bacilli, few of which probably in their original active state succeed in surviving the passage through the various lines of defence on their way to the root glands. It is the perivascular and peribronchial interstitial tissue rather than the pulmonary tissue proper which is mainly affected at this very early stage, when the lymphatic exits to the glands are freely open and the glands themselves functionally active. Small isolated foci of broncho-pneumonia do, however, occur, and usually heal up rapidly. The fine radiating hilus streaks seen with the X rays even in healthy children may have originated from a fibrous transformation of this small-celled perivascular and peribronchial connective-tissue infiltration. On the other hand, the mottling, blotching, and other evidences of gross hilus lesions, are probably later phenomena associated with the stagnation or backward flow of lymph consequent on the blocking resulting from glandular disease, whether active or quiescent.

The present writer inclines to the view that the bacilli which pro-

duce the actual pulmonary disease do not necessarily or even generally come from the infected glands, which probably act more as blocks, causing stagnation of the lymph stream, which contains bacilli derived from inhalation, peribronchial deposit, and other sources. These bacilli find their way through the distended afferent lymphatics and so invade the pulmonary tissue. This process would tend to extend gradually farther, and so in this way the disease would slowly advance from hilus to periphery. On this retro-impulsion of lymph theory (fully described in "Hilus Tuberculosis,"[1] *Clinical Journal*, January 22, 1913) a healed

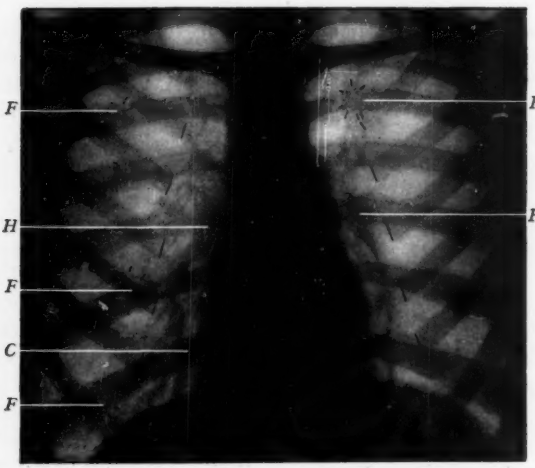


FIG. I.— SKIAGRAM OF CHEST FROM SUPPOSED CASE OF SPASMODIC ASTHMA FOLLOWING WHOOPING-COUGH IN BOY AGED NINE YEARS. IN REALITY A CASE OF HILUS TUBERCULOSIS.

Note blotching (*H*) at roots of both lungs (most distinct on right side) lying external and parallel to the narrow, vertically placed cardiac shadow. At the right hilus there are two small opaque spots suggesting old calcified foci (*C*). Linear shadows may be traced passing towards the periphery and extending in the direction of the apices as high as the level of the second rib in front. Here and there throughout both lungs may be seen small rounded opacities (*F*) arranged in clusters, indicating foci of tuberculous broncho-pneumonia. N.B.—After three months' open-air treatment at Bournemouth patient gained one stone in weight, and the asthmatic attacks entirely disappeared.

calcareous gland with no active bacilli might act as an indirect cause of pulmonary affection simply due to its blocking action.

The principal evidence in support of the hilus as a primary focus of disease is obtained from *radiographic examinations*. In regard to the important question of the right interpretation of the various root shadows, including the diagnosis of acute and chronic tuberculosis, the

[1] See "Hilus Tuberculosis," *Clinical Journal*, pp. 247-250, January 22, 1913.

reader is referred to the writer's original article already alluded to and to the recent discussion at the Royal Society of Medicine[1] on "X Rays in Pulmonary Tuberculosis."

The accompanying radiograms illustrate an early and a late stage of hilus tuberculosis.

The *pathological evidence* of the spread from the hilus is, in the nature of the case, necessarily scanty. Patients do not die in the early stages of chronic pulmonary tuberculosis, when the disease is limited to the root area. At death the lungs are generally infiltrated throughout,

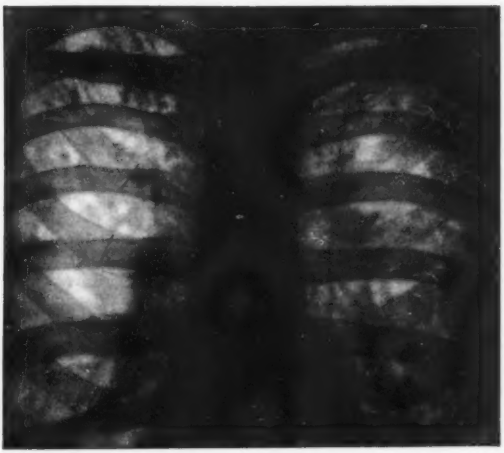


FIG. 2.—SKIAGRAM FROM CASE OF CHRONIC FIBRO-CASEOUS TUBERCULOSIS (SUPPOSED ASTHMA).

Case of gentleman, aged thirty-nine years, with twelve months' history of asthmatic attacks. Had occasional cough and expectoration, which contained tubercle bacilli. The physical signs consisted of a few crepitations at the right anterior apex, numerous rhonchi scattered over both lungs, and impaired expansion of both sides of the chest. Note the elongated cardiac opacity, the extensive hilus blotches on both sides, the well-marked striation and numerous rounded opacities in both lungs, and particularly the finger-like processes extending from the hilus to the right apex.

so that it is almost impossible to tell whether the disease started at the root or at the periphery. Still, occasional cases have arisen (and will be forthcoming more and more as time goes on) when the patients have died from some intercurrent disease or complication, and where the pathological evidence has strongly supported X-ray findings.

In one case published by Dr. Jordan it was possible to compare the previous X-ray pictures with the post-mortem findings, the patient having died of tuberculous ulceration of the intestines before the disease

[1] See Proc. Roy. Soc. Med., vol. vi., Nos. 5 and 6, 1913.

of the lungs had advanced beyond recognition. In this case the pathological changes corresponded precisely with the radiographic appearances.

It is not at all uncommon to meet post mortem with instances of extensive disease more or less limited to the root area, while the apices and peripheral portions of the lungs may be wholly or comparatively free from tuberculous infiltration. Fig. 3 is a good illustration of this type of case, of which the writer has seen a considerable number,

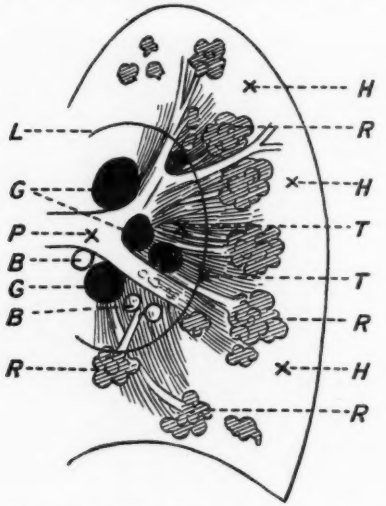


FIG. 3.—CHRONIC FIBROID PHTHISIS COMMENCING AS HILUS TUBERCULOSIS.

This drawing was made from a specimen in Brompton Hospital Museum (Catalogue No. 116), and represents a complete section through right lung. It is an excellent example of chronic fibro-caseous phthisis, the disease having evidently commenced at the hilus and extended outwards into the surrounding tissue in a wonderfully symmetrical fashion. *P*, Pulmonary vessel cut longitudinally; *B*, air-tubes cut across; *G*, caseous bronchial glands at hilus; *T*, tuberculous fibrous thickening and infiltration extending outwards from hilus; *R*, racemose tubercle in perihilus area; *L*, imaginary line circumscribing hilus of lung; *H*, peripheral zone of healthy lung-tissue $\frac{3}{4}$ inch wide. (*Drawing by author.*)

in which extensive central disease is surrounded by a peripheral zone of healthy pulmonary tissue.

It is a drawing of a specimen in the Brompton Hospital Museum from the case of a man, aged thirty-four years, who died in the hospital. The following is the description of the naked-eye characters of the right lung taken from the museum catalogue published in 1904: "Numerous recent racemose tubercles with pigmented centres and caseating circumferences are seen *affecting the central portions of the upper*

and lower lobes, a shell of practically unaffected lung-tissue about ⅔ inch thick separating them from the pleural surface. This specimen explains how in some cases extensive tuberculous disease of the lungs may be present, and yet the physical signs may be scanty or altogether absent." The disease in this case seems to have extended more or less continuously in all directions, though the principal extensions are along the pulmonary vessels and air-tubes.

The great majority of acute and chronic *pleurisies*, whether dry or accompanied by sero-fibrinous effusion, are tuberculous in origin, although there may be nothing in the lungs or elsewhere to suggest the presence of tuberculosis; and Sir William Osler states that *in almost every instance of tuberculous pleurisy there are tuberculous foci in the bronchial glands.* Applying here also the doctrine of the retro-impulsion of lymph, the ready extension of the tuberculous process from the hilus to the pleura along the terminal pleural lymphatics is obvious. The extensive tuberculosis of the pleuræ and the mediastinal glands so frequently found in cattle is significant in this connection. There is also a close association between *asthma*, particularly in children, and hilus tuberculosis (see Figs. 1 and 2). According to C. Weigert, *acute miliary tuberculosis*, whether pulmonary or general, is often the direct result of penetration of branches of pulmonary veins by caseating bronchial glands.

The rapidity of the extension of the tuberculous process in the lungs is, as a rule, inversely proportional to the degree of immunity—natural or acquired—the determining factors being not so much the numbers or virulence of the invading bacilli, as the resistive power of the invaded tissues on the one hand, and the degree of vulnerability and phagocytic efficiency of the bronchial mucous membrane on the other.

The fact that most of us have had at one time tuberculous deposit now represented by calcified glands or fibrous thickening at the roots may in reality be an advantage. A definite degree of immunity due to the presence of antibodies has thus been gradually established during childhood, and we are actually in a better condition as adults to resist any future invasion than if we had never contracted the disease at all. It is probable, indeed, that the gradual reduction in tuberculosis mortality in civilized countries is largely due to the fact that the population has become gradually immunized in this way. This theory will serve to explain the alarming spread of and mortality from tuberculosis among the native adult populations of Bengal, the West Indies, Australia, and elsewhere, who have not been immunized.

As regards the *value of early diagnosis* of hilus tuberculosis, it is impossible to over-estimate its importance. The late Dr. Gee was of opinion that, "if physical signs of pulmonary tuberculosis were present,

the probabilities were against complete recovery; but if the disease were detected before this, there was hope that it might be cured." This statement is as true now as it was twenty years ago. In modern instantaneous radiography we have a method of diagnosing early cases of pulmonary tuberculosis that Dr. Gee in his day did not possess, it being now possible to discover deep-seated central tuberculous disease in the hilus and surrounding pulmonary tissue before the tubercle bacilli appear in the sputum and long before physical signs manifest themselves.

THE ADJUNCT TREATMENT OF TUBERCULOSIS WITH CERTAIN ORGANIC EXTRACTS.

By HENRY R. HARROWER,
M.D.,
Late Professor of Clinical Diagnosis, Loyola University, Chicago, Illinois.

As the years go by our ideas regarding the treatment of tuberculosis are modified, and in no phase of therapeutics do opinions change so much. About 1890 Professor Koch discovered a therapeutic wonder in tuberculin, but its vogue was short-lived, for the intricacies of dosage had not then been learned. Less than ten years ago hyperalimentation was the fashion, and, as with fashions in other things, it was carried to extremes. Nowadays tuberculin has regained its place, but its application is almost an obsession, and the devotion of some practitioners to tuberculin in one form or another seems to show that the fashion has changed again.

There appears to be an idea, almost universal, that as tuberculosis is an invasion of the body by a certain bacillus, the treatment must needs be directed primarily towards the destruction of these organisms and the neutralization of their toxic products. That this is essential none will deny, but, unfortunately, the view is much too narrow. Tuberculosis is first and foremost a condition of lowered resistance in which the infective process has become so prominent as quite to overshadow the original and by far the most important defect. The following extract from a recent editorial[1] aptly states the matter in the plainest of language:

"The cause of active tuberculosis must now be sought in something which destroys our tolerance, and permits our own lesions to

[1] See *American Medicine*, New York, 1913, xix. 1, 5.

develop. Chief among these causes are the acute infections. . . . In addition to these infections anything else which lowers the general health may thus interfere with that constant production of antibodies upon which our tolerance depends. We can definitely trace many cases to a long period of overwork, alcoholic excesses, exposure to wet, or adverse climate conditions. Indeed, anything which interferes with a perfect condition of health may allow the spread of a focus of infection which we had carried around for a half century or more. Even senility itself may do this. Many men carry the pneumococcus in their mouths all their lives, only to be killed by it in the end ; and we must now look upon the tubercle bacillus in the same light of a constant companion, harmless as long as we remain in good condition, but a malignant enemy the instant our guards are lowered."

It is admitted that the good results of the hygienic methods at present in vogue are evidence that a general building-up and restoring of the vitality is needed, but, after all, is not this merely a passive form of resistance? Some more active adjunct would be welcome, and it is believed that such will be found in a consideration of the internal secretions as well as of the possibilities of organotherapy as an auxiliary method of treatment.

Arnold Lorand, in his interesting book "Old Age Deferred," points out that when the usual sanatorium treatment is having its good effects there is a local disintoxication, and the cells of the lungs are co-operating in this process in a manner analogous to the internal secretion by the cells of other glandular structures. This may be one reason for the advocacy by some of extract of lung-tissue as a remedy in pulmonary disorders[1] [2] Lorand continues :

"It is a positive fact that under-nutrition (or defective nutrition) through lack of the necessary amount of proteids in the diet exposes one more to infection by the bacilli. . . . The findings of Grawitz indicate that an insufficient proteid diet predisposes also to anæmia. The importance of this fact is emphasized by Sajous, who has shown (1903) that defective nutrition weakens the activity of the pituitary, thyroid and adrenals, the secretions of which take an active part in the destruction of bacteria and their toxins."[3]

The usual general manifestations almost invariably present in cases of tuberculosis—fever, lassitude, and diminished metabolism—cannot but be accompanied by disturbances of a similar nature in the work of the internal secretory organs. Perhaps the importance of these functions, many of which are as yet little understood, is even greater than

[1] Brunet, F. : "Le suc Pulmonaire : Effets Physiologiques et Thérapeutique," *Bull. Méd.*, Paris, 1896, x. 1239 ; *ibid., C. R. Soc. Biol.*, Paris, 1897, 10, iv. 24.
[2] Grande, E. : "Il Polmone un Opoterapia," *Riforma Med.*, Naples, 1897, xiii. 391.
[3] Lorand, A. : "Old Age Deferred," 1911, chap. xxxvii., p. 313.

we think, and certain facts can bear much emphasis and repetition. Professor Schäfer, in his presidential address before the British Association, June, 1912,[1] says: "The second essential condition for the maintenance of the life of the cell-aggregate is the co-ordination of its parts and the due regulation of their activity, so that they may work together for the benefit of the whole. . . . The activities of the cells constituting our bodies are controlled in another way than through the nervous system—viz., by chemical agents circulating in the blood. . . . These substances have received the general designation of 'hormones,' a term introduced by Professor Starling. Their action, and indeed their very existence, has only been recognized of late years, although the part which they play in the physiology of animals appears to be only second in importance to that of the nervous system itself; indeed, maintenance of life may become impossible in the absence of certain of these hormones."

When we consider all the emphasis that has been laid upon the importance of the internal secretions, it seems strange that their relation to tuberculosis is rarely mentioned. Treatment based upon the regeneration or regulation of these important glandular functions is quite the exception, and will continue to be until the importance of their relation to the original cause of tuberculosis is realized.

Our French colleagues, always more alert in the application of measures "on the border-line of progress in therapeutics," have for some years been emphasizing the importance of "Les Opothérapies dans la Tuberculose," and a valuable résumé with the above title was recently published.[2] In this article reference is made to no less than fourteen distinct forms of opotherapy, of which perhaps only one—the use of red bone-marrow—has found any favour in England and America.

It would seem that the most important phase of the organotherapy of tuberculosis is unquestionably the use of spleno-pancreatic extracts. Next in importance is the use of preparations from the liver, and the value of these methods is enhanced by the administration of secretin—a hormone prepared from the pylorus and duodenum.

With the use of extracts of thyroid, pituitary, adrenal, lung, ovary, and testes, I have had no experience, and although numerous references to these various subjects can be found in the medical literature, especially that of France and Italy, the remainder of this article will be devoted to a brief consideration of the forms of organotherapy first mentioned—the use of the extracts of spleen, pancreas, liver, and duodenum.

[1] Schäfer, E. A.: "The Nature, Origin, and Maintenance of Life," *Lancet*, London, 1912, ii. 675.

[2] Lereboullet, P.: "Les Opothérapies dans la Tuberculose," *Paris Medical*, 1912, 51, 586.

Practically every form of organotherapy that is recommended in tuberculosis is useful only as it influences nutrition, and this is essentially true of the use of splenic extract. In an exhaustive paper on the subject,[1] the writer has gathered together some information regarding the fundamental functions of the splenic hormone, and concludes that the value of splenic extract in practical therapeutics may depend on the occurrence of a hormone or hormones which are concerned in the defences of the blood in tryptic and intestinal digestion in the reparative processes, and in certain specific functions on the part of the spleen itself. Bayle, of Cannes, has obtained results which he regards as almost of a specific nature, and in his paper, read before the last International Congress at Rome,[2] he concludes:

"I feel authorized by my results to call splenic opotherapy a specific treatment for tuberculosis. It is a specific from the therapeutic viewpoint, because it modifies the soil, rendering it less suitable as a medium for the culture of the bacillus of Koch. It is a specific from the practical viewpoint because it manifests all the function and rapidity of action of a specific medication. Employed in convalescents it prevents tuberculosis by increasing the mineral content of the tissue (*en rémineralisant le terrain*). Employed in confirmed cases of tuberculosis it cures them." Bayle has recently given a very concise résumé and bibliography of his entire work on this subject.[3]

Schröder,[4] [5] Superintendent of the Neuen Heilanstalt für Lungenkranke, Schömberg, along with his colleagues there, has made an extensive series of experiments on puppies and guinea-pigs, and concludes that the administration of spleen extract exercises a powerful influence against the progress of inoculation tuberculosis in these animals. "The minimizing effect of the spleen extract was obvious, insuring a longer duration of life and milder lesions in the animals treated, as compared with the control animals."

Van Stockum,[6] of Amsterdam, has carried out a series of interesting tests in the treatment of tuberculosis with extract of spleen previously exposed to the X rays. His report on 3,000 cases so treated is convincing evidence that the use of this preparation is followed, especially in the surgical forms, by an early betterment. He also lays stress on

[1] Harrower, H. R.: "Therapeutic Action of Splenic Extract in Tuberculosis," *Lancet*, London, 1913, i. 524.

[2] Bayle, C.: "L'Opothérapie Splenique," *Trans. Int. Tuber. Congr.*, Rome, 1912.

[3] Bayle, C.: "Splenic Opotherapy in Tuberculosis," *Prescriber*, Edinburgh, 1913, vii. 106.

[4] Schröder, G.: "Über die Rolle der Milz als Schutzorgan gegen Tuberkulose Infektion" (I. Teil), *Beitr. z. Kl. d. Tuberkulose*, Wurzburg, 1909, xii. 323.

[5] Schröder, Kaufmann, and Kögel: *Ibid.* (II. Teil), *Beitr. z. Kl. d. Tuberkulose*, Wurzburg, 1912, xxiii. 1.

[6] Van Stockum, W. J.: "Die Therapeutische Wirkung der mit Röntgen-Strahlen Vorbehandelten Milz bei Tuberkulose," *Wien. Kl. Wochenschr.*, 1912, xxv. 1857.

the harmlessness of this method. In a recent editorial[1] appears a statement which deserves emphasis: "The subject is certainly one that should not be lost sight of, and practitioners may well remember that advantage may accrue from the use of splenic substance as an adjuvant at any rate."

Tuberculous patients are invariably sufferers from toxæmia, not only the specific toxæmia, but also that due to stagnant digestive functions and deficient detoxicating power. We know that the successful use of various liver extracts for a number of years definitely has proved that they have a noticeable detoxicating power,[2] due doubtless to the fact that the internal secretion of the liver has this property. This is probably the cause of much of the good that has resulted from the use of this class of preparations. Lemoine and Gerard[3] have brought forward a petroleum extract of bile called "paratoxine," which is said to be useful in tuberculosis, chiefly on account of its antitoxic action.

In studying this subject, and applying it in their extensive clinical work in Paris, Gilbert and Carnot[4 5] found that liver extract possessed an antihæmorrhagic influence, and they used it in the treatment of hæmoptysis, especially in tuberculosis, with very encouraging results. In cases where tuberculosis is associated with hepatic enlargement and derangement this form of organotherapy confers great benefit. H. Parmentier[6] reports that liver extracts have a generally good influence in tuberculosis, causing an increase in weight as well as a decrease in the night sweats and number of bacilli in the sputum. His experiences confirm those of Gilbert and Carnot, which proved the value of liver preparations in hæmoptysis.

It has been frequently suggested that the therapeutic value of cod-liver oil is due in considerable part, not to the contained fat, but to a certain internal secretion of the liver of the cod. This may act directly, or, more likely, according to Leonard Williams,[7] by stimulating one of

[1] Editorial: "The Therapeutic Action of Splenic Extract," *Univ. Med. Record*, London, 1913, iii. 326.

[2] For further information, see "Opothérapie," P. Carnot, 1910, p. 479; "La Pratique de l'Opothérapie," L. Hallion, 1911, p. 22; "Les Produits Biologiques Médicinaux," Byla and Delaunay, 1912, p. 302.

[3] Gerard, E., and Lemoine, G.: "Sur la Composition de l'Extrait Étheré (Lipoïde) de la Bile," *Bull. et Mém. Soc. Méd. d'Hôp. de Paris*, 1909, 3, xxviii. 935. See also *Nord Méd.*, Lille, 1909, xvi. 121, 241, 253; *ibid.*, 1910, xvii. 129; *Rév. Mod. de Méd. et de Chir.*, Paris, 1910, viii. 165; *Méd. Moderne*, Paris, 1910, xxxi. 93.

[4] Gilbert, A., and Carnot, P.: "Note Préliminaire sur l'Opothérapie Hépatique," *C. R. Soc. Biol.*, Paris, 1896, 10, iii. 934; *ibid.*, "De l'Opothérapie Hépatique dans les Hémorragies," *C. R. Soc. Biol.*, Paris, 1897, 10, iv. 445.

[5] Carnot, P.: "L'Hémostase par Opothérapie Hépatique," *Paris Medical*, 1911–12, 484.

[6] Parmentier, H.: "Traitement de la Tuberculose Pulmonaire par les Extraits Hépatiques Tolaux," *Bull. Gén. de Thér.*, Paris, 1911, clxi. 218.

[7] Williams, Leonard: "The Therapeutic Promise of the Internal Secretions," *Practitioner*, London, 1911, lxxxviii. 605.

the normal internal secretory glands, the secretion of the one so stimulated being inimical to the development of the tubercle bacillus. It is a significant fact, he adds, that the darker and more crude the cod-liver oil the more efficacious it is.

The pancreas undoubtedly plays an important part in defending the body against infection. In proof of this one has only to remember the frequency with which diabetics suffer from boils and local infective processes, and the remarkably high percentage of diabetics that suffer and die from concomitant tuberculosis. This leads one to believe that the pancreas, in addition to its known functions, plays an important part in regulating resistance to infection. Brieger[1] has shown that pancreatin lowers the abnormally high antitryptic index of the blood in tuberculosis, and predicts that eventually treatment will be on the lines of a combination of pancreatin and tuberculin. Strubell[2] has made the definite statement that pancreatin administered *per os* increases the opsonic index to the staphylococcus. This may explain some of the encouraging results obtained from spleno-opotherapy in tuberculosis, and also the benefit to the diabetic which often follows pancreatic therapy. Referring to this, the editor of the *Medical Record*[3] says: "The future may witness the routine use of pancreatin in tuberculosis. . . . and in many chronic affections with lowered opsonic index."

Digestion is almost invariably poor in tuberculosis, and, unfortunately, in no class of disease is a vigorous digestion more necessary. The tendency to push the feeding of the consumptive often overtaxes digestion, and where hyperalimentation is necessary, or where decreased digestive capacity has already made itself manifest, secretin is a most reasonable and useful remedy.

As originally shown by Bayliss and Starling, secretin is a specific chemical activator of pancreatic function, produced in the duodenal walls. Secretin actually combines with the precursors of the pancreatic digestants and is used up in their formation. Other investigators have shown that this influence is not confined to the pancreas, but that secretin stimulates both the peptic and the oxyntic glands of the stomach, as well as those glands which produce the succus entericus, and some French investigators pointed out that secretin also stimulates the liver. Whether the influence of secretin is or is not as widespread as has been stated above, there can be no doubt that it has a salutary influence upon digestion, an influence nowhere more essential than in the treatment of tuberculosis. Boardman

[1] Brieger, L.: "Kombinationstherapie bei Pernizioser Anämie," *Deut. Med. Wochenschr.*, Berlin, 1912, xxxviii., ii. 2154.

[2] Strubell, A.: "Der Einfluss der Hormone auf den Opsonischen Index," *Berl. Kl. Wochenschr.*, 1912, xlix. 2350.

[3] Editorial: "New Aspects of Pancreatic Organotherapy," *Medical Record*, New York, 1913, lxxiii. 205.

Reed draws attention to the organic derivatives as valuable factors in the treatment of indigestion, and gives his experiences[1] with a preparation called "secretogen," which contains gastric and pancreatic secretins and enterokinase, with 0·5 per cent. HCl. It has proved in a number of cases to be much more effective than the usual pepsin-HCl combinations, rapidly bringing the stomach up to normal, and improving the intestinal digestion and assimilation. The author gives the result of gastric analysis made in one of the cases, in which secretogen was suspended for a month. The proportions of both free and combined HCl were found to be still a little above normal, though before the remedy was taken there had been no free HCl at all, and the proportions of both combined HCl and total acidity were below normal.

The importance of hormones in the treatment of disease is daily being more fully recognized, and there is little doubt that before long their value as an adjunct in the treatment of tuberculosis will be generally accepted. The results already published admit of no doubt, and are sufficient at least to disarm scepticism. We have not found a panacea for tuberculosis, nor are we likely to find one soon; but it cannot be gainsaid that the control of the body functions as a whole—and especially that control aimed at in an attempt to regulate the hormone balance—will be eventually a very important factor in the successful treatment of tuberculosis. We shall do well to bear this in mind, not forgetting that "an attitude of obstinate unreceptive scepticism leads only to stagnation and death, and has certainly no place in an atmosphere where men are striving to unravel difficult and elusive problems."[2]

The successful therapist owes his position to a thorough attention to detail, no less than to his appreciation of probabilities, both diagnostic and therapeutic; and if the possibilities of hormone therapy materialize, as they bid fair to do, there is every hope that the prevention and cure of the great white plague may eventually become an accomplished fact.

[1] Boardman Reed: "Organic Derivatives in Indigestion," *Amer. Journ. Gastro-Enterol.*, October, 1912 (abs. in *Prescriber*, Edinburgh, 1913, vii. 147).
[2] Williams, L.: "The Quickening Spirit," *Brit. Med. Journ*, 1910, ii. 928.

HABITATIONS FOR THE TUBERCULOUS.

By VINCENT HOOPER,
A.R.I.B.A.

This article deals with the main principles which should guide the arrangement, planning, and construction of habitations for the tuberculous—viz., sanatoria, sanatorium hospitals, and residential sanatorium schools. The term "sanatoria," which is used here in the restricted sense, refers to institutions for the residential treatment of adult patients suffering from pulmonary tuberculosis, whose condition is, generally speaking, neither acute nor advanced; whilst the term "sanatorium hospitals" should be understood to refer to special buildings for the treatment either of acute or advanced cases, or both.

The Appendix of the Final Report of the Departmental Committee on Tuberculosis contains a memorandum by a subcommittee with regard to sanatoria, and submits a suggestion for the classification of the sanatorium unit: (1) Sanatorium proper; (2) hospital; (3) administrative section; and (4) power-house and laundry. According to such, patients are to be divided, the majority, or some 80 per cent., being accommodated in the sanatorium, and acute cases, or some 20 per cent., in a hospital block. This marks a distinct advance, and should lead to very interesting developments in planning. The "hospital" is intended for cases requiring nursing, and includes a reception block where newly-arrived cases can be kept under observation, and where those suffering from acute symptoms can receive special treatment. Whether the hospital should or should not accommodate advanced cases is a point apparently undecided. Some would prefer that the chronic and advanced patient should be housed separately in hospitals or homes more easy of access than the average sanatorium, whilst others, opposing this idea, point out that such places become homes for the dying, and are therefore most undesirable places.[1] The question is a difficult one in the case of the smaller sanatorium, but in the larger institution there would appear no great objection to provision being made for advanced cases in separate blocks.

If accommodation for children is to be provided it must be arranged in absolutely separate buildings. It is really best to consider the provision for children entirely apart from that for adults; but if the site for the sanatorium is large and suitable, and it is desired to have the

[1] In this connection see Dr. J. A. D. Radcliffe's memorandum, p. 150, of the Appendix to the Final Report of the Departmental Committee on Tuberculosis. London: Wyman and Sons, Ltd., 1913.

whole scheme of institutional treatment in one place and under one chief medical officer, then the children should have their own block on their own land, with entrances, paths, walks, etc., as much as possible separated from those attached to the sanatorium. This would be the "Residential Sanatorium School."

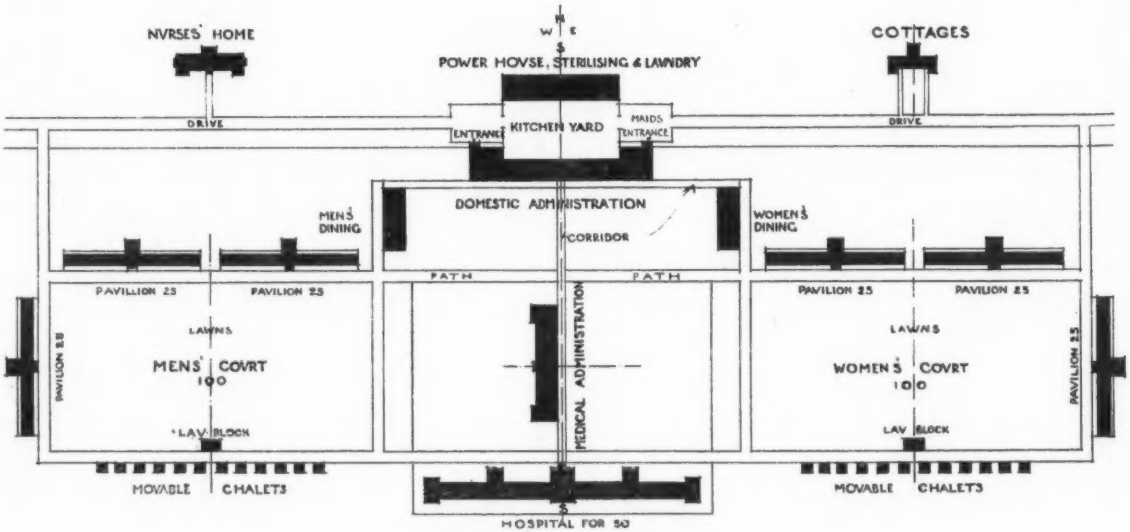
A classification of the sanatorium unit can now be made as follows: 1. *Administrative Section.*—(*a*) Medical administration; (*b*) domestic administration; (*c*) power-house; (*d*) sterilizing station and laboratory; (*e*) laundry; (*f*) residential staff quarters. 2. *The Hospital.*—(*a*) Reception and acute cases; (*b*) advanced cases. 3. *The Sanatorium Proper.*—(*a*) Patients' rooms; (*b*) lavatory blocks; (*c*) dining and recreation rooms. 4. *The Residential Sanatorium School.*—(*a*) The home; (*b*) the open-air school.

The type of plan adopted for many of our modern sanatoria may guide the planning of future institutions, but no special type should be slavishly followed, as it is very doubtful if any type perfectly suited to our British ideas has so far been evolved. The plan for the "hospital" might very well, however, follow the ordinary type of a straight or crescent-shaped building, one room and corridor in thickness; the "sanatorium" consisting of separate pavilions connected by covered ways or paths.

The "hospital" can accommodate both sexes, but in the "sanatorium" it is better to house men and women in distinct blocks, as the separation of the sexes cannot be too definite. In connection with this question there is, however, a real difficulty in determining the number of men and women patients, and as the proportion is variable, some method must be devised whereby the number of beds on either side can be decreased or increased as the occasion arises.

The aspect for the buildings should be carefully considered on the site, together with data relating to the prevailing winds and rainfall. The "hospital" should have a southerly aspect, but this is not essential for the "sanatorium" or "school." A sunless aspect is naturally out of the question, otherwise any point of the compass from east to west by south may be suitable. General hospital wards are usually planned on a north and south axis, and a "sanatorium" pavilion, one room in width, on the same principle, should be equally successful.

The classification of the sanatorium unit can now be considered in greater detail. The "administrative section" is shown divided into five departments, the "medical" placed first as the centre of the whole institution. This is the centre for organization and control: here should be placed all the principal medical working rooms and offices, except the laboratory. Its position in the general plan should be closely related to the patients' rooms and in a lesser



SKETCH BLOCK PLAN.

Illustrating the classification of the Sanatorium unit applied to an institution for 250 patients.
The hospital for fifty, two storeys high; the pavilion, each for twenty-five, one storey; and twenty-five movable chalets, each for two beds, attached to the men's or women's side as required.

degree to the "domestic" department. The ideal position of the principal entrance is midway between the "medical" and "domestic" departments, avoiding any direct exposure of the medical rooms. The "domestic" department is the distribution centre, chiefly of food. Here the plan should permit of the easy receiving, preparing, and delivering of food, not only to the dining-room of the "sanatorium," but also to the "hospital" and staff-rooms. Here also should be placed a housekeeper's room and stores, and in larger institutions the steward's offices. Although this department must be central as regards service, it should not overlook the patients' quarters, or be too closely related to them, and especial care must be taken to avoid a position offensively near the "hospital."

In small sanatoria it may be possible to avoid an undue capital expenditure by a decentralization of the plant for power, lighting, and hot water, thus making each block independent in these respects; but in larger institutions the wiser course is to centralize these various requirements in one block. Where this is done, steam has to be raised for heating and hot water, cooking, laundry, and sterilizing purposes, possibly also to provide power to run dynamos and laundry machinery. At the present time oil may possibly take the place of steam as the power for producing electricity, and this last may displace both steam and oil as power for laundry machinery, pumps, and other plant. The power centre should adjoin the "sterilizing station" and "laundry," and be not too remote from the "domestic" department.

Every sanatorium must have a properly-equipped "sterilizing station," with two rooms, one for apparatus to destroy sputum, and one for an efficient disinfector to take clothes, bedding, and all articles that need to be frequently sterilized; the second door of the latter apparatus may be made to open into the receiving-room of the laundry. A good type of sputum-destructor is the "Meathop." The laboratory should adjoin the sputum-room, and, if provided, the mortuary and post-mortem rooms. In most sanatoria the laboratory need be nothing more than a sputum-examination room, and will only require equipping on a modest scale. The "laundry" should adjoin the power-house, since the engineer often has to attend to the laundry plant. The equipment should be absolutely up to date. A good arrangement is to fit the laundry with ample storage and a workroom, and so make it a centre for receiving and distributing all the house linen.

The question of "residential staff quarters" depends so much upon the size of the institution and the methods of staffing, that it is difficult to lay down rules that should guide in every case. Owing to the fact, however, that sanatoria are often placed amidst very rural surroundings, the staff have little opportunity for recreation outside the bounds of the institution. It is necessary, therefore, to provide accommoda-

tion on a more liberal scale than so many sitting-rooms and bedrooms, planted down wherever a convenient, or inconvenient, place can be found, and also to give such quarters the pleasantest possible outlook. In a small sanatorium a pleasant house for the medical officer is almost essential, and in a larger institution the chief should certainly have a house standing in its own garden. Assistant medical officers should generally be housed near to or above the "medical" department. The nurses should have a "home," even if it is only a cottage; the maids could be housed on the first floor of the "domestic" department; the men attendants (if any) either in châlets or a small block by themselves; whilst the chief engineer and steward would require separate cottages. One thing should not be forgotten, that, within reason, the sanatorium principle of the open-air room should guide the planning for the staff-quarters as well as other parts of the institution. As to the dining-rooms for the staff, these are best placed near the kitchen. A medical officer's dining-room may be required, but nurses, maids, and men attendants must have separate rooms. Regard is not always given to the requirements of visitors; the patients' friends have to be thought of, and a room where they can meet and have a meal together is a desideratum in the easy and pleasant working of a sanatorium. The medical officers and nurses should also have facilities to put up a friend for a few days.

The "hospital" should consist of a corridor or covered way, with mostly single bedrooms to the south, and sanitary blocks at intervals to the north. It is desirable to have the corridor as free as possible from buildings on both sides, and for this reason the omission of rooms where the sanitary block occurs; and the planning of an open veranda or staircase at such a spot is very desirable. A veranda, or balcony, on the same level as the patients' rooms should, if possible, be provided. With a view to greater privacy a straight front with projections at intervals has advantages over the crescent form. Recreation and dining rooms are required more in "hospitals" for advanced cases than in those for acute patients; such rooms should, however, not be planned on the main front, unless it be at the ends. A nurse's duty-room must be provided, and the sanitary fittings should include the usual hospital sinks, and baths that stand free of the walls.

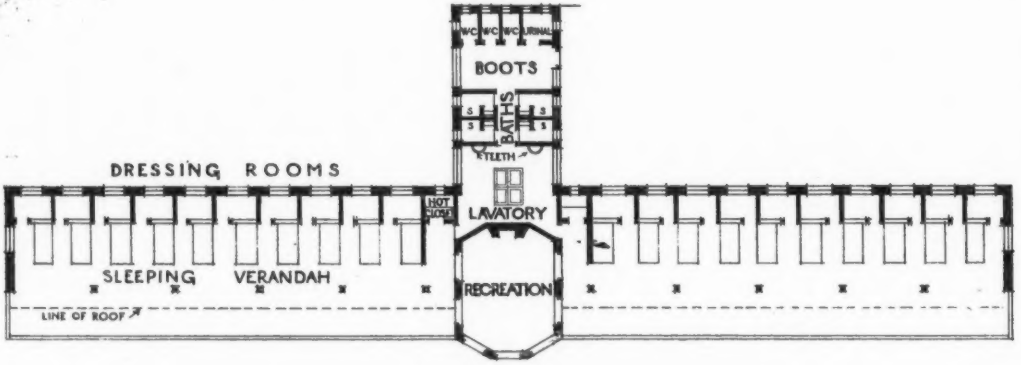
The patients' rooms in the "sanatorium" may be planned for from two to six beds; the two-bedded room is, however, popular, especially for women. A corridor to gain access to these rooms is, generally speaking, unnecessary in this country; a paved walk on one or both sides of the rooms, with protection in the nature of overhanging eaves or a veranda roof, is sufficient, and this method also permits of more perfect cross ventilation. For one-bedded rooms a floor-space 9 feet by 8 feet is ample; for two beds 11 feet by 9 feet is just sufficient; but 12 feet by

10 feet is better. In a ward, about 60 square feet floor-space per bed should be the minimum. A height of 8 feet for smaller and 9 or 10 feet for larger rooms is sufficient. Cubic space need not be considered, as all that is generally required is sufficient floor-space to take a bed, chair, pedestal, and cupboard, and leave a comfortable margin for the patient or others to move about. The sanitary block in a "sanatorium" need only be connected to the patients' rooms by a covered way, and should consist of a large lavatory, fitted with lavatory basins and special basins for teeth-cleaning, rails and hooks for towels and clothes, racks for patients' brushes and glasses and mirrors, well lit on the men's side for the purpose of shaving. Through a door from this lavatory access may be obtained to slipper or shower baths, w.c.'s, boot and cloak rooms. Shower-baths have the advantage of costing less capital outlay and using less water than slipper-baths, and they are also more cleanly, and, if well arranged, more persons can take their bath in a given time.

The dining-rooms are generally planned in the domestic administration; but in large sanatoria it is a question whether it would not be best to place these rooms near the patients' blocks, and convey the food thither from a central kitchen in bulk, a servery with hot-plate, etc., being provided to each dining-room. Where patients wash up their own plates, etc., a long narrow pantry with a number of small sinks is necessary; but where this work is done by maids or attendants, a modern washing installation, not necessarily mechanical, should be installed. Recreation rooms should be provided, not necessarily adjoining the patients' own rooms. One large room would often suffice, but with larger numbers a smaller room, or rooms for reading and quiet games, and a larger one for billiards, etc., is a better arrangement.

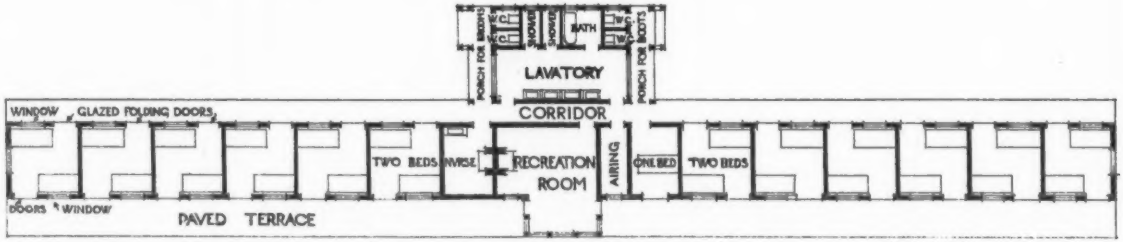
The object to be aimed at in the "residential school" is to provide a home where children will be in continual residence for from a few months to two or three years, a bright and cheerful building permitting of thorough ventilation, and provided with open-air balconies for sleeping, open-air dining and play rooms, and quarters for a sister, teacher, and nurses. In addition to this, near by should be one or two open-air classrooms and a workshop. The question of age-limit for boys at such a school is important, and if this class of building is erected to any extent, separate homes will have to be put up for boys after reaching the age of seven or eight years.

The construction of a sanatorium is a problem that needs a great amount of thought and experience. There are three distinct schools of teaching. On the one hand, those who believe in the erection of permanent buildings; on the other hand, those who recommend merely temporary erections, whilst a third party would advocate a reasonable



A "SANATORIUM" PAVILION FOR TWENTY PATIENTS.

On the American method of open verandas for beds, with separate dressing box for each person.



A "SANATORIUM" PAVILION FOR TWENTY-FIVE BEDS.

One single bedroom, twelve two-bedded rooms, each bed against a window. Paved walks with overhanging eaves permit of access to rooms.

permanence of construction, without the heavier expenditure of the first class. The question wants considering in a reasonable way, and whilst the palatial building must be abandoned, there are strong reasons against going to the other extreme and merely erecting shacks. The requirements of construction are, briefly, that the materials should be reasonably permanent and fire-resisting, hygienic, strong, cheap, and simple in erection.

An inquiry should always be made as to the local materials, and the probable cost of building with these; and if that method seems too expensive, consideration should be given to a light steel erection filled in with hollow concrete or brick, cement plastered on the exterior. For one-story pavilions few materials can surpass timber, especially if precautions are taken to isolate each block against fire risk, and well protect and ventilate the timber near the ground-level. For floor finish nothing has been invented to surpass best quality linoleum laid on ordinary boarded floors, but with a concrete base. Well-laid cement, terrazzo, or tiles, form a perfect floor, with the exception that they are cold.

The sanatorium of the future may have no doors or windows at all; for the present, however, these appear necessary, but should not be excessive in number. Double doors in two heights are very satisfactory, the lower being solid panelled, the upper either glazed or merely louvred. Louvres, however, do not keep out driving rain or snow; and copper-wire gauze, as used at the Cumberland Sanatorium in lieu of glass, seems a most excellent device.

The "hospital" and "administrative section," together with the dining and recreation rooms, should have a vacuum steam-heating system, controlled by the engineer on the medical superintendent's orders. The "sanatorium" may also have such a system, but it is not essential unless the district in which the buildings are situated is excessively damp. Petrol gas is a simple, cheap, and effective illuminant, but electric lighting is still the ideal to be sought for. The obtaining of an ample water-supply is an essential of every site, and the possibility of effective disposal of sewage is almost equally important, and often more difficult. This should be borne in mind when choosing a site. For the present there should be no endeavour to standardize sanatoria on the lines of any one type, as such a policy is sure to discourage original endeavour, and tend to the erection of uninteresting and unsuitable buildings. Desirable results will rather be obtained by the collaboration of doctors and architects, qualified by special knowledge and experience, to suggest and prepare schemes that shall fulfil modern requirements, suit the conformation and aspect of the site, and take into consideration the climate of the district in which the institution is to be placed.

THE PIORKOWSKI-FRIEDMANN TURTLE TUBERCULIN.[1]

By Dr. PIORKOWSKI.

I shall first describe the historical development of the origin of my turtle tuberculin preparations. In 1901 Friedmann came to me and brought two large turtles which had become spontaneously tubercular. Their lungs contained a large number of tubercular nodules, and he asked me to prepare pure cultures from these organs. I did this, and I succeeded in obtaining pure cultures on suitable nutrient media, as glycerine agar and bouillon. Friedmann remained with me nearly a whole year in order to do further work on the cultures. Meanwhile I made a large number of experiments on my own account. Some turtles I fed, others I inoculated, and of the large number of the latter only two manifested the symptoms shown by Friedmann's turtles. It was therefore evident that we were dealing with a special strain of bacillus, which, when developing on a specially prepared nutrient medium, exhibited the symptoms of tuberculosis. It is very noteworthy that the turtle tubercle bacillus in its further behaviour, both culturally and morphologically, displayed an extraordinary resemblance to the human tubercle bacillus. Its growth at 37° F. is remarkably characteristic. The main point about this strain is that it can be used without the risk of any manifestations—a circumstance which may be ascribed to the fact that for the last ten years it has been reinoculated afresh daily, and thus has acquired generally an extraordinary innocuousness, becoming both avirulent and atoxic.

The differentiation of the various tubercle bacilli is especially well carried out by Knoll's modifications of Unch's method, consisting of a double stain by means of fuchsin, methyl violet and resorcin. This method reveals long slender structures with regular nuclei in human tubercle bacilli, but in this variety the nuclei are often seen to be irregularly divided and of a variable size. In avian tubercle bacilli they are somewhat shorter, and in turtle bacilli they are very small—almost like dots. In my opinion the extraordinary resemblance of the various tubercle bacilli is to be attributed to the zoological grouping, and such resemblances only occur in lung-breathing animals.

We must differentiate between mammals which produce their offspring alive, the class to which human beings and oxen belong; and birds—*i.e.*, that is, animals which lay eggs; and, thirdly, reptiles, which possess horny or long integument and also lay eggs. Lizards, croco-

[1] A lecture delivered by Dr. Piorkowski of Berlin at the Royal Hospital for Diseases of the Chest, City Road, on April 1, 1913.

diles, and turtles belong to the last class. Finally, we have to think of fishes which breathe as long as they are young through gills or by their lungs, and also lay eggs. We thus see very clearly that resemblances are to be found only among lung-breathing animals, and it is for this reason, probably, that the results described are obtained on the injection of tubercle bacilli of similar kind. It became very evident that turtles were especially adapted for our purpose.

The method of working with living bacilli is not entirely new, for the same principle was used by Behring in his experiments on the extermination of bovine tuberculosis. He employed human tubercle bacilli, which are atoxic to oxen, with good results; and therefore the attempt to immunize human beings with turtle tuberculin is quite rational. I can explain the process very satisfactorily by the side-chain theory of Ehrlich. According to this theory, the nutriment of an animal is taken up by means of cells. Each cell possesses a central active nucleus which carries out the function of the cell, and a so-called side-chain—a receptor. The cell takes up nutriment by means of this receptor, and then a very remarkable proceeding occurs. The portion of the cell which has absorbed the nutriment breaks away from the rest, becomes metabolized, and a new receptor is developed in the original cell; but not merely one receptor—an actual overgrowth of receptors takes place (Weigert's law of over-compensation). The new receptors have charged with nutritive material, break away, and carry the nutriment to different parts of the organism, thus effecting nutrition. This theory not only accounts for the method of nutrition, but it also explains how toxic action occurs; because cells not only possess receptors for food-molecules, but also for other substances, and these receptors are as numerous as they are varied. Some of them take up particles of nutriment, others take up poisons, absorb ferments, others the products of bacterial fermentation or similar processes.

Let us, for example, consider a toxic action a little more closely. When a poison enters the body—*e g.*, tubercle toxin—the first point concerns the existence of receptors which can take up the tubercular poison. If these do not exist, no infection by tubercle bacilli can occur, for the organism possesses *congenital immunity* towards the action of these bacilli. But if there be some arrangement for receiving them, and appropriate receptors for the tubercle bacilli exist, these take up the poison, and if absorbed in sufficient quantity, a general toxæmia ensues, which may lead to the destruction of the organism. If, however, the receptors have the opportunity of loading themselves with the poison, and if they drop off the cell after they have become useless and harmless, then an excessive production of these receptors occurs, as stated previously. A constant succession of new receptors becomes formed; but there is not room enough on one cell for the attachment

of so many receptors, and the result is that the newly-formed elements become discharged into the serum before they have been able to take up any of the toxin. The receptors thus discharged come into contact with poison in regions far distant from the site of the sensitive cells, and are there seized upon, whereby a ventilization of the poison takes place and it is rendered injurious. In this manner an acquired specific immunity is developed, and the newly-formed bodies are termed "antitoxins."

The harmless turtle tuberculous toxin combines with the receptors, and the combination is thrown off into the blood as antitoxin. Now receptors are formed in large quantity, but they are capable of seizing not only the turtle tubercle bacilli, with which they have been hitherto dealing, but also human bacilli, and thus render them harmless. If there is a profuse formation of new receptors, and if the human tubercle bacilli have increased unduly, complete recovery may be effected, and the *rationale* of the cure is along these lines. There is also the additional advantage that turtle tubercle bacilli are innocuous and harmless, and therefore this method is especially well adapted for protecting inoculation. But even if the body is already affected with tuberculosis the disease can be suppressed, because its course is so protracted. The process is very much the same as that of Jenner's vaccination against small-pox, except that in the latter case the agent is calf-lymph, whereas here it is the turtle tubercle bacillus. All the endeavours of therapeutics in tuberculosis based upon Koch's work, which consist of injections of living tubercle bacilli or the virus, attain a certain result, but, if accurately judged, fail to reach their ultimate aim. In order to attain this end it is necessary that the antigen which is to invoke the protective and curative powers of the body should be alive, but deprived of the poisonous properties—avirulent and atoxic. It is, further, necessary that the tubercle bacillus which is concerned in this matter should be treated as carefully as possible, and should be both active and specific. To a very considerable extent these desiderata have been arrived at.

I have made two preparations. One is the suspension of living turtle tubercle bacilli in physiological salt solution, and the other is turtle tuberculin prepared like Koch's, but no temperature higher than 35° C. *in vacuo* is employed in its preparation. The administration should be intramuscular, but it may also be given subcutaneously or into a vein. The suspension should first be given in doses of 0·5, 1, 2, 3 c.c.; later on, the turtle tuberculin in doses of 0·1, 0·3, and 1 c.c., according to the stage of the disease and temperature—in other words, according to the clinical condition. It is best to begin with 1 c.c. of the suspension, to double the dose in eight to ten days, and then to inject the tuberculin after another eight days, repeating the latter

injection at frequent intervals. It has appeared, as a rule, that the doses of living turtle tubercle bacilli do not require to be used more than three times. Numerous experiments on animals and the treatment of a large number of cases have confirmed the absence of any toxic effects. Owing to the careful methods of preparation of this remedy, there have hitherto been no instances of induration or abscess; there have only been slight infiltrations, which subsided very satisfactorily. The most striking clinical results have been the rapid subsidence of fever, night sweats, pain in the chest, and other pains. Very soon there is an increase in weight, appetite returns, and the feeling of fatigue disappears.

Professor Meyer has obtained very good results with turtle tuberculin, and in his opinion it is in every way superior to Koch's tuberculin. Bandolier refers to a case which could not tolerate even the smallest doses of sensitized bacilli and albumose-free tuberculin, but which tolerated large doses of turtle tuberculin easily and satisfactorily. Klemperer is able already to point to a large number of cases wherein the remedy was well borne. Karfunkle of Berlin has also injected a large number of patients. Heid of Pittsburg has demonstrated good results in 80 per cent. of the cases.

Detailed records will be published in due course. It is obviously necessary to treat a very much larger number of cases, and the remedy requires further trial. It is best to inject into the muscles of the gluteal region. Cases of tuberculosis of the larynx and skin, and also surgical tuberculosis, have also been benefited, and it is to be hoped that the trials which are being made by many reliable investigators will be followed by good results.

CRITICAL REVIEW.

THE SYMPTOMATOLOGY AND TREATMENT OF PRE-TUBERCULOUS AND EARLY TUBERCULOUS PULMONARY CONDITIONS IN ELEMENTARY SCHOOL CHILDREN.

By D. M. TAYLOR,

M.A., M.D., D.P.H.,

Medical Officer, Bermerside Residential Open-Air School, Halifax, Yorkshire.

No more fascinating, nor elusive, nor intricate problem can be found in the whole range of medicine than the diagnosis of pulmonary tuberculosis in children. The difficulties in the case of an adult are great, even to the most skilful, much more are they so in children; and every attempt to seek, analyze, and weigh systematically, the early signs and symptoms of this condition should be encouraged. In waiting for all the classical textbook signs, in allowing "time" and the progress of the case to decide our action, we miss that valuable early moment of treatment. In children especially, it is better to act on suspicion or presumptive evidence than fail to catch the very beginning of a disease so insidious, so varying in its form, and so uncertain in its progress.

The Frequency of Tuberculosis in Childhood.

The failure to appreciate the milder forms of pulmonary tuberculosis has led to the most divergent views on the frequency of its occurrence in children. Pathologists of experience in this country say that tuberculous breaking down of lung tissue is rarely found post mortem in children; the more minute research, with microscopical help when necessary, of Continental observers reveals a considerable percentage of children's bodies (55 per cent. according to Hamburger) with evidence of ganglionic and pulmonary tuberculous deposit.[1] School medical officers from the clinical side range in their estimate from 15 per cent. of all children to as low as 0·078 per cent.[2] The general death-rates during the school period are very low, but the proportion of pulmonary tuberculosis to total deaths shows that pulmonary tuberculosis enjoys

[1] See "Tuberculosis in Infancy and Childhood." Edited by Dr. T. N. Kelynack. London: Baillière, Tindall and Cox. 1908.

[2] See Annual Reports of Sir George Newman, M.D., Chief Medical Officer to the Board of Education. London: Wyman and Sons, Ltd., Fetter Lane, E.C.

a high share in the mortality of school children—viz., 1 in 7 during the ten-to-fifteen age period. This being so, what of the morbidity from this disease to whose worst ravages school children are largely immune, possibly from infection in the pre-school period, and in view of the fact that phthisis pulmonalis offers a decidedly favourable prognosis during this period of life?

The bulk of the evidence, pathological and clinical, increasing day by day, seems to establish that pulmonary tuberculosis is not a rare disease in school children; but before this view is generally accepted by the profession the whole clinical picture of the disease in a child must be altered, and its study approached from the clinical standpoint.[1]

Pre-tuberculous Conditions in Childhood.

"Pre-tuberculous" is not quite a suitable word, as we mean something more than merely predisposing conditions. Prepulmonary would express our class more accurately — *i.e.*, children showing evidence of tuberculous infection, with some pulmonary signs; but the latter, although suspicious of pulmonary deposit, are not definite enough to be labelled as early phthisis. They include children spoken of as threatened with, predisposed to, susceptible to, or in such a condition as are likely to develop, true pulmonary tuberculosis. To this group belongs a large number of those suffering from (thoracic) glandular disease, with some extension to the lungs. These children show great variations in their health, and are the subjects of frequently recurring indefinite illnesses. They are badly nourished and anæmic, look drawn and sickly, and in many of the cases are to be noted hindrances to full lung expansion—*e.g.*, pigeon-breast, elongated chest, spinal curvature, or other deformity. Their periodic illnesses have in varying degree the following signs and symptoms: (1) During the attacks the temperature rises in the late afternoon to 100° or more; (2) there is loss of appetite, gastric disturbances, or actual vomiting; (3) cough or catarrhal signs or glandular swelling; (4) any existing otorrhœa, rhinorrhœa, or blepharitis, or enlargement of the glands, is for the time being exacerbated; (5) the child shows nerve signs, is irritable, becomes peevish, sulky or wayward, changed in manner, and dull or inattentive at lessons; (6) there is flagging, and fatigue signs rapidly appear on slight exertions; (7) the lung signs are altered breathing at one or both apices, or marked cough, or the presence of enlarged veins over chest, or some flattening, or change in the percussion note, especially about the clavicles. The signs are of a transient and rapidly varying character, and the lesion probably miliary.

[1] Consult "Medical Examination of Schools and Scholars." Edited by Dr. T. N. Kelynack. London: P. S. King and Sons. 1910.

Attacks of this kind, lasting from forty-eight hours to four or five days, recur at intervals of weeks or months, and, in my opinion, indicate that the child is reacting to a dose of tuberculous poison. After the attacks the general condition of the child is much improved, and reminds one of the immediate beneficial effect of tuberculin injections.

It might be objected that these symptoms are due to various social, scholastic, or domestic causes, or to other infantile complaints and disorders. Such argument cannot avail, in our experience, where the children are under continuous medical and nursing supervision in a residential school, and their trivial ailments reported and recorded.

Among cases coming under my observation, the average age has been eight years and seven months. The number of boys exceeds the girls in proportion of 4 to 3. There was a family history of phthisis in 58 per cent. The prognosis is good if the subjects are well fed, kept clean, and lead an open-air life away from their homes; if neglected they may finally, after the age of ten or twelve years, pass into the true or adult form of phthisis pulmonalis—*i.e.*, all pre-tuberculous children, as here defined, are potential cases of pulmonary tuberculosis at a later age. A specific case will illustrate some of these points: A. B., female aged nine years, had attended school very irregularly for two years owing to frequent undefined illnesses, but latterly the mother had conveyed to the attendance officer some vague medical opinion of the child having consumption. There was a very clear family history of tuberculosis. The girl, admitted to our open-air school in May, 1910, was pale, without energy or interest, below average weight, nutrition very poor, so-called "facies" and occasional diarrhœa with no dietetic cause. Careful and repeated examination by myself and the consulting medical officer showed no physical signs except rather harsh breathing at both apices. She did well, the lung signs disappeared, and at the end of the summer session in open-air school (six months' stay) she had increased in height 1½ inches, weight 6 pounds 6 ounces, and hæmoglobin 8 per cent. During the following winter her condition was stationary, but with the spring showed signs of deterioration. She was again certified for the open-air school in May, 1911 (age ten and a half years), with marked anæmia, loss of weight, and dulness with harsh broken R.M. at the right apex, troublesome cough, and some sweating at night. She continued to lose ground, ceased to attend the school, and in July had expectoration streaked with blood. In bed two months, and absent from school all the winter up to March, 1912, when she was admitted into the residential school as an early case of phthisis pulmonalis; bronchial breathing at the right apex before and behind, relapsing persistent phlyctenular kerato-conjunctivitis, and positive Pirquet reaction.

These pre-tuberculous children form a large percentage of the scholars admitted to day open-air schools, who do well for a time, but relapse on return to ordinary environment.

Tuberculous Pulmonary Conditions in Early Life.

One seldom gets a complete clinical picture of true pulmonary tuberculosis in childhood of the adult type. The symptoms detailed amongst the suspected class as well as the family history may influence the final summing-up of the examiner. The lung tissue in children is less specialized, and their immunity is higher; hence the damage is not so marked and less progressive, and the recovery quicker. The physical signs in children are similar to the adult, although less marked. In all cases there is more or less impaired movement. The presence of enlarged veins under the clavicles is significant, and hollowing in the clavicular fossæ due to twisting of the spine must be excluded. Palpation of glands is of doubtful value. Light percussion is essential. Dulness may be elicited, although rarely in a marked degree. Dulness in certain areas from much enlarged tracheal or hilum glands needs differentiation. Absence or feebleness of the breath sounds, tubular breathing, cogwheel respiration, point to tubercular deposit, whilst remembering the general character of the R.M. in children—viz., prolongation of the expiratory phase—and the frequency amongst them of patches of collapsed lung, causing weak R.M., but not affecting the movement. Moist sounds, fine or medium, and rhonchi, are often of a very fine character, require careful auscultation, and may be heard only as a fine crackle at the end of expiration or forced coughing. The average age of our first batch of phthisical children was ten years and nine months—38 per cent. boys, 62 per cent. girls, with a family history in over 80 per cent. The right apex was affected in 55, the left in 27, and both lungs in 18, per cent. The large percentage in which the right apex alone is involved is a matter of considerable difficulty in diagnosis, for in healthy children you find on the two sides a certain difference in character of the respiratory murmur. A true estimate demands careful comparison of the two lungs. The physiological difference between the right and left apex is no doubt explained by anatomy. The right bronchus is shorter, wider, and more horizontal, than the left, and the bronchial branch serving the upper lobe of the right lung branches sharply upwards from the bronchus before this enters the lung substance. Pathologically, an altered character of the R.M. in the right apex might be due to obstructed nasal breathing (disappearing on removal of adenoids and tonsils), or through pressure of swollen bronchial glands, which are more numerous and reach a higher level on the right side than on the left. X rays, screen and plate, aid the clinical picture, and often reveal local and generalized pulmonary or

glandular deposits, unrecognized by our ordinary physical methods. Cough is not a marked feature, even in cases with definite signs of breaking down. As a rule it is short and easy, only occasionally hard and paroxysmal. Expectoration may be absent or scanty. Generally, even in older children, the sputum is swallowed. Records of finding the tubercle bacillus in children's sputum are rare. A frequent bacteriological examination of the stools might prove serviceable. Hæmoptysis is rare. Wasting, loss of weight, and stationary weight, have some value as symptoms. Temperature affords valuable indications. Night sweats occur as in adults. Local sweatings about the head on slight exertion are often noted. Laryngitis of a catarrhal character is common; true tubercular laryngitis in school children is rare.

Points in Diagnosis.

This presents special and peculiar difficulties. No progress will be made unless we widen our outlook on the disease as it affects children, and study more minutely, with careful following up, the various phases at different age periods. From five to ten years the systemic characters predominate ; it is only after ten years, increasing in frequency each year up to adolescence and early adult life, that the local lung signs become prominent. Von Pirquet, Calmette and other tuberculin reactions are, in my opinion, of little diagnostic value in individual cases. Laboratory proof that tuberculosis in school children is as common as measles will avail nothing. When a specific treatment is found, many obscure pulmonary and prepulmonary signs may receive their due valuation.

Methods of Treatment.

(*a*) *The Non-Infected.*—This embraces the whole range of preventive and State medicine. The main points are—(1) The influence of heredity in rendering the tissues less resistant to the attacks of the bacillus, and the question of marriage into and amongst tuberculous stock. (2) Children of tuberculous stock or in infected homes should be under constant supervision, the milk-supply beyond suspicion, and adult open cases isolated. It will be a long time before we can educate certain classes of the community up to hygienic methods of living, sputum disposal, etc. (3) All predisposing causes and factors tending to weaken the defensive powers must be removed. In the front rank is malnutrition. School, home and personal hygiene and cleanliness are of the utmost importance. Children must be protected from whooping-cough, measles, and other infections. Measles cases should be followed up until complete convalescence with sound mucous membrane. (4) The feeding of necessitous school children is doing good service, although food alone is insufficient to stay the disease.

(5) Medical inspection is rapidly attacking predisposing conditions by removal of carious teeth, adenoids, tonsils, etc., and by regulating physical exercises.

(*b*) *Those Already Infected.*—(1) The children must be removed from tuberculous sources, to avoid reinfection or the danger of a sudden addition of a massive dose, aggravating the disease or bringing disaster. (2) Secondary infection of the tuberculous child must be avoided by the usual hygienic measures of abundant fresh air, cleanliness, etc., and by protection from infectious colds, catarrhs, influenza, measles, and the other non-notifiable and notifiable diseases. (3) Open-air day-schools afford opportunities for regular sufficient feeding, education physical and mental adapted to the child's needs, spray baths, and the open air to encourage respiratory exchanges. These day agencies, while doing good work, are open to many criticisms as scientific remedial agencies in our so-called "pre-tuberculous" and "early phthisical" cases. The work of the day is often undone by the sordid unhygienic conditions of the home at night: there is the constant risk of infection and reinfection in the tuberculous home, there is no supervision of the hours of sleep at night, and the treatment lacks continuity, being interrupted by night, at week-ends, and by closing of the special school in the beginning of winter. (4) The majority of the children here considered require prolonged care in some form of institution, either a sanatorium or a residential school. By this means alone can we obviate the above criticisms of open-air schools, and apply skilled medical and nursing supervision as well as the necessary treatment. (5) Tuberculin treatment in children opens up a wide field of research and usefulness. Auto-inoculations are difficult to control in children, nor can hygienic dietetic methods alone be considered sufficient. The writer has for some time, with gratifying results, given a course of Old Tuberculin, beginning with 0·00001 c.c., increasing very slowly at eight-day intervals up to 0·001 c.c., the whole course extending over five or six months. In children such treatment is best carried out in an institution.

PERSONAL OPINIONS.

THE TUBERCULOSIS NURSE.

By Miss MARY S. RUNDLE,

Matron, the Royal Hospital for Diseases of the Chest, City Road, London.

The openings for nurses with special training in tuberculosis are increasing to such an extent that the demand already exceeds the supply. For the impetus in this branch of nursing the National Insurance Act is largely responsible. The Welsh National Memorial also is claiming many nurses. From the nurse's point of view tuberculosis nursing is not without its attractions. In hospitals devoted to the work there is a good deal of interest to be derived from the study of modern methods of treatment. In sanatoria the open-air and recreative life has its attractions, but still more popular is the tuberculosis dispensary, a centre for preventive work. This branch appears to be idealistic where the nurse is what Florence Nightingale called a "health missioner."

The qualifications necessary for this work are a good general training, followed by an appointment at a chest hospital or sanatorium, some knowledge of sanitation and hygiene, such as the Royal Sanitary Institute offers in its course of training for school nurses and health visitors, and a sympathetic understanding of human nature, often gained by an experience in district nursing. It is usual for a tuberculosis dispensary nurse to live independently of the dispensary, unless the dispensary is attached to a hospital, when it is more advantageous for the nurse to live in the hospital. The freedom of living out is appreciated by some natures after years of institutional restriction; especially is this desired if the nurse's work should be situated that she is able to live at home, otherwise the salary usually given provides little enough margin beyond the necessities of life. It has been suggested that women other than trained nurses might be entrusted with this work, since there is practically no nursing done by the dispensary nurse. This suggestion should be deprecated, even if there is no nursing, except in an emergency; it is the sick and diseased who are to be helped towards health. Who but a trained nurse can be expected to view in the right proportion the condition of ill-health? And as the fundamental law of successful teaching is to proceed from the known to the related unknown, the untrained woman lacking that fundamental knowledge cannot be expected to be a successful teacher,

and for the same reason it is necessary that a nurse acquaint herself with some knowledge of sanitation and hygiene.

The nurse, having first met the patient in the dispensary, fills up the case-sheet by obtaining the personal and family history, taking the temperature and weight. It is important that this should be carefully and correctly done, sometimes not an easy matter when so much depends on the disposition of the patient; the nurse needs much judgment and patience. Then follows an examination by the doctor. It is frequently one of the nurse's duties to teach the patient to take and record his own temperature, and especially if the patient is under tuberculin treatment. The next day the visit to the home is made. Here it is that tact and understanding are indispensable. It is not improbable that the nurse's visit is unwelcome, the motive being misunderstood, for she has not come to nurse a sick member of the family, or to bring tangible assistance, but her errand is to obtain information concerning the occupations and personal habits of the family, and to report on the state of the home, sleeping accommodation, and sanitary conditions. It is possible she may be refused admission, for she has no legal authority to enter the home, although it does contain one suffering from a notified disease, and it must be by the goodwill of the family that she gains admission. Then advice is given on every detail. Other members of the family—*i.e.*, "contacts"—are persuaded to come to the dispensary to be examined by the doctor, so that early symptoms discovered can be treated at once, and advice given as to the best modes of living. A nurse's duty does not end with one visit, she calls again and again to see that her advice is being carried out. There are, too, many organizations, sources of help for the nurse to become acquainted with, so that she may have in her power ways and means of providing the necessaries for the very poor.

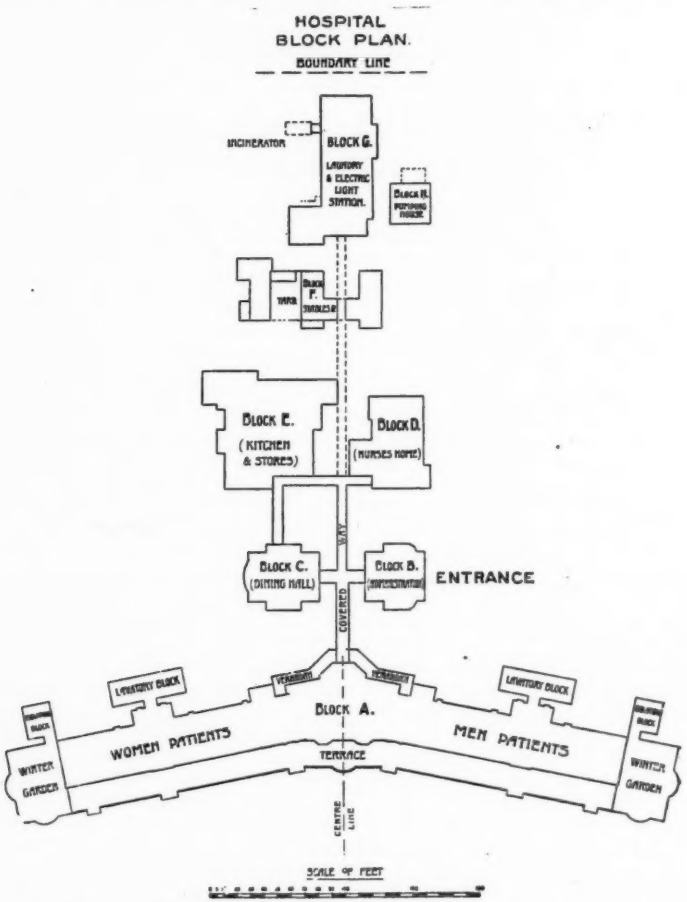
The tuberculosis nurse is greatly assisted in her task by medical men who will give popular lectures to the patients and their "contacts" as carried out at the Royal Chest Hospital, City Road, by members of the staff, this hospital having a tuberculosis dispensary attached. These lectures, dealing with sources of infection, questions of dirt, and unhealthy conditions in the home, etc., are illustrated by cinema and lantern slides, and besides affording a very popular entertainment, are most instructive, as the results have demonstrated. At this hospital, also, there are periodical post-graduate courses for nurses wishing to take up preventive work. The courses consist of lectures which are given by members of the staff, and of practical experience in the preventive department, and on the district. This is the only hospital of this description that offers opportunities for nurses outside its own staff to gain knowledge in a branch of work which is making great demands upon the nursing profession, and the opportunity, unique as it is, is being appreciated by members of that profession in large numbers.

INSTITUTIONS FOR THE TUBERCULOUS.

THE MOUNT VERNON HOSPITAL, NORTHWOOD, MIDDLESEX.

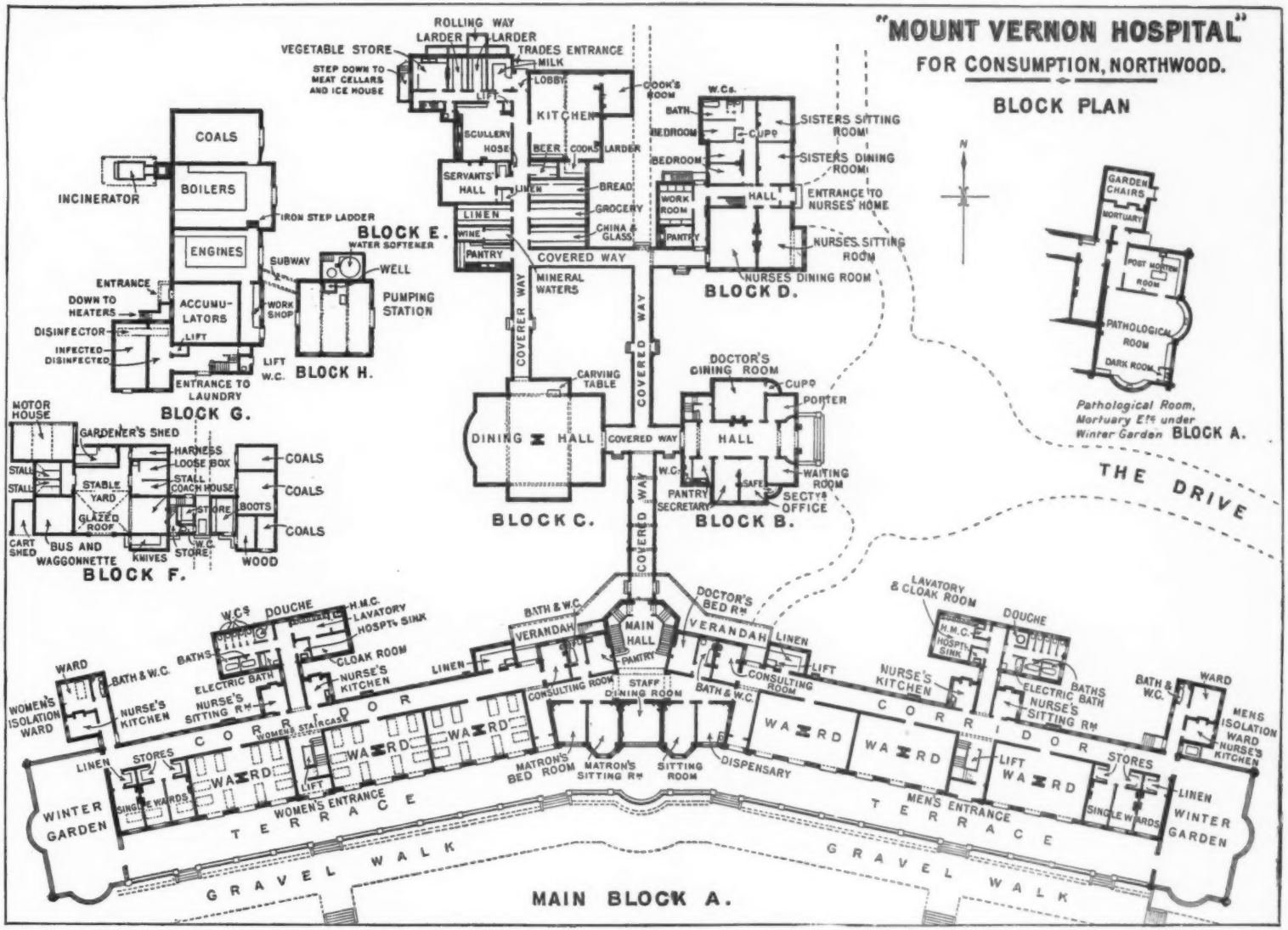
THE Mount Vernon Hospital at Northwood stands in an estate of 104 acres in the county of Middlesex, sixteen miles from London, and is situated at an altitude of 375 feet above the level of the sea. The Hospital was built from designs prepared by Mr. Frederick Wheeler, F.R.I.B.A. The foundation stone was laid by H.R.H. the Princess Christian, on May 13, 1902, and the first patients were admitted on September 19, 1904. The Hospital is admirably situated on dry elevated ground, consisting in large measure of sand and gravel overlying chalk. The view from the buildings is far-reaching, and the grounds are undulating, well-wooded, and peculiarly suited for the conduct of the requisite exercises, which constitute so important an element in the restorative treatment of the patients. The Hospital, with its necessary adjuncts, consists of seven separate blocks. The accompanying illustration indicates the form and general character of the portion specially devoted to the use of the patients. This building consists of a central administrative block and two wings, all facing south, the latter being placed at such an angle that the wards used by women patients have a south-south-east aspect, while those for men look south-south-west. The central block is composed of three stories containing quarters for a Resident Medical Officer and Matron, Dispensary and Consulting Rooms, a Board Room and Library, and accommodation, including baths and necessary offices, for servants. The wards have been so constructed as to afford free access of light, a plentiful supply of perfectly pure air, and all the comforts of an hygienic habitation. There are ten large wards, each capable of accommodating ten patients. The wards on the ground floor open directly on to a wide and well-paved terrace by means of large double French casement windows. Over every window is a specially designed lattice roller-blind, which allows of protection from heat, wind, and rain, insures privacy, and yet permits of a plentiful penetration of fresh air. In the centre of each large ward is a stove, which, however, is only used in special need. The fittings of every ward are in accordance with the latest hygienic requirements. The cubic air-space per bed is not less than 1,000 feet. The wards open on to a wide, well-lit, paved and tiled corridor, which runs the whole length of each wing, and on its north aspect abundant air can be admitted through a series of large windows. On the north side of each ward, and over every ward door, there are pivoted windows, the upper borders of which are immediately below the ceiling, and thereby, even when south-west gales necessitate the closing of the front

French casement windows, the entry of air from the north allows of bed-fast patients enjoying the benefits of a practical open-air existence. In addition to the large wards, there are twelve others designed for single-bed cases, and each is provided with an open fireplace. There are also two isolation blocks, each with accommodation for patient and

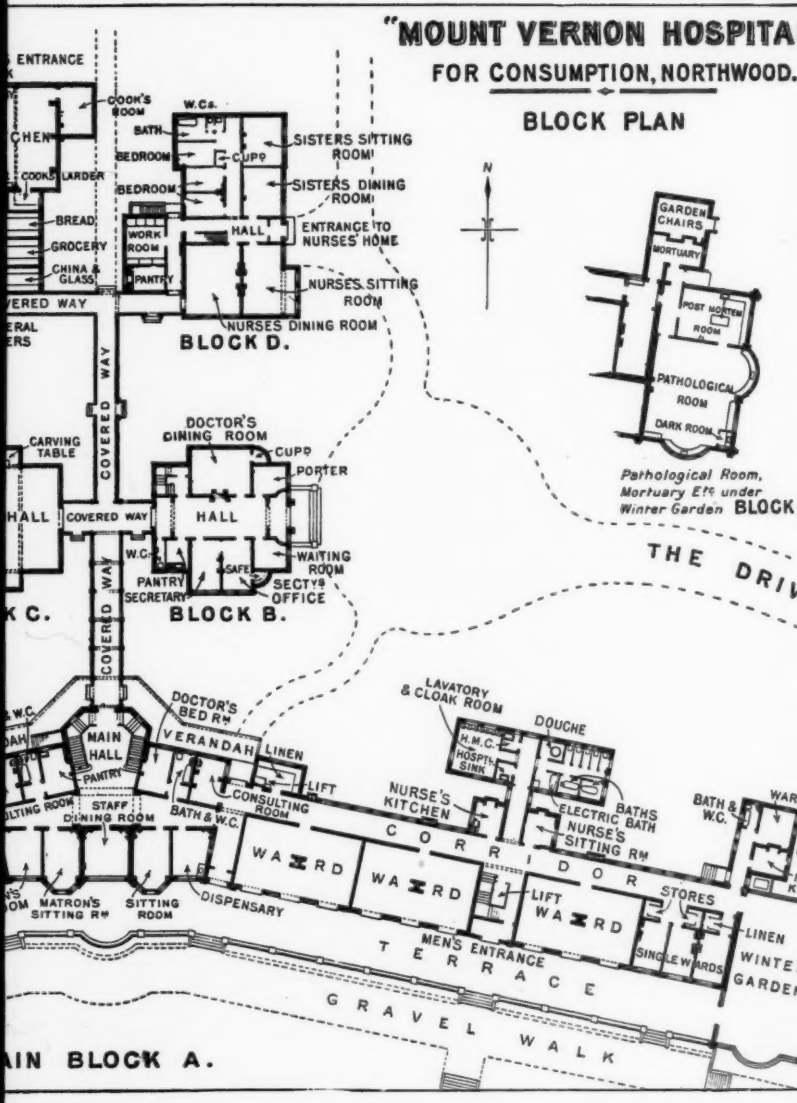


nurse, and supplied with means for simple cooking and lavatory and sanitary necessities.

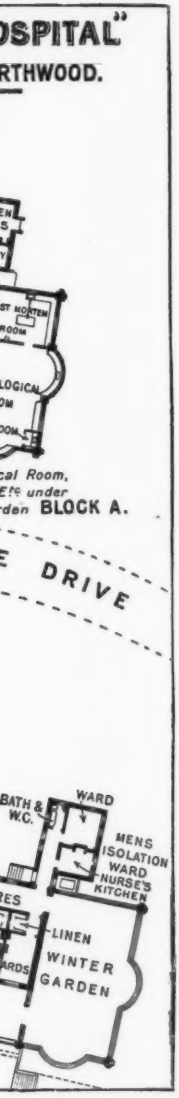
On the north side of each corridor are the sanitary blocks, each with the entrance so placed as to be opposite to the patient's entrance from the grounds, in front of the Hospital. Each block contains lavatories, water-closets, cloak and boot rooms, and baths of every description. At the extremity of each wing is a large winter garden, which, while


"MOUNT VERNON HOSPITAL"
FOR CONSUMPTION, NORTHWOOD.
BLOCK PLAN
N
ROLLING WAY
LARDER
LARDER
VEGETABLE STORE
TRADES ENTRANCE
MILK
STEP DOWN TO MEAT CELLARS AND ICE HOUSE
LOBBY
LIFT
KITCHEN
COOK'S ROOM
W.Cs.
BATH
BEDROOM
CUPD
SISTERS SITTING ROOM
BEDROOM
SISTERS DINING ROOM
HALL
ENTRANCE TO NURSES HOME
NURSES SITTING ROOM
NURSES DINING ROOM
SCULLERY
HOSE
BEER
COOK
LARDER
SERVANTS HALL
LINEN
BREAD
GROCERY
CHINA & GLASS
LINEN
WINE
PANTRY
WORK ROOM
PANTRY
COVERED WAY
MINERAL WATERS
COVERED WAY
COVERED WAY
BLOCK E.
BLOCK D.
COALS
BOILERS
INCINERATOR
IRON STEP LADDER
ENGINES
WATER SOFTENER
SUBWAY
WELL
PUMPING STATION
ENTRANCE
DOWN TO HEATERS
ACCUMU-LATORS
WORK SHOP
DISINFECTOR
LIFT
INFECTED
DISINFECTED
LIFT
W.C.
BLOCK H.
ENTRANCE TO LAUNDRY
BLOCK G.
GARDEN CHAIRS
MORTUARY
POST MORTEM ROOM
PATHOLOGICAL ROOM
DARK ROOM
Pathological Room, Mortuary Etc under Winter Garden BLOCK A.
MOTOR HOUSE
GARDENER'S SHED
HARNESS
LOOSE BOX
STALL
STALL
STABLE YARD
STALL
COACH HOUSE
GLAZED ROOF
STORE
BOOTS
COALS
COALS
COALS
CART SHED
BUS AND WAGGONNETTE
KNIVES
W.C.
STORE
WOOD
BLOCK F.
CARVING TABLE
DINING HALL
COVERED WAY
DOCTOR'S DINING ROOM
CUPD
PORTER
HALL
W.C.
PANTRY
SECRETARY
SAFE
WAITING ROOM
SECTY'S OFFICE
BLOCK C.
BLOCK B.
THE DRIVE
W.Cs
DOUCHE
H.M.C.
LAVATORY
HOSPTL SINK
BATHS
CLOAK ROOM
WARD
BATH & W.C.
ELECTRIC BATH
NURSE'S KITCHEN
WOMEN'S ISOLATION WARD
NURSE'S KITCHEN
NURSE'S SITTING RM
LINEN
BATH & W.C.
VERANDAH
MAIN HALL
PANTRY
DOCTOR'S BED RM
VERANDAH
LINEN
LAVATORY & CLOAK ROOM
DOUCHE
H.M.C.
HOSPTL SINK
BATHS
ELECTRIC BATH
NURSE'S SITTING RM
NURSE'S KITCHEN
BATH & W.C.
WARD
MENS ISOLATION WARD
NURSE'S KITCHEN
CONSULTING ROOM
STAFF DINING ROOM
BATH & W.C.
CONSULTING ROOM
LIFT
CORRIDOR
WOMENS STAIRCASE
WARD
WARD
WARD
WARD
WARD
LINEN
STORES
SINGLE WARDS
LIFT
MATRON'S BED ROOM
MATRON'S SITTING RM
SITTING ROOM
DISPENSARY
LIFT
STORES
SINGLE WARDS
LINEN
WINTER GARDEN
WOMENS ENTRANCE
TERRACE
MENS ENTRANCE
TERRACE
WINTER GARDEN
GRAVEL WALK
GRAVEL WALK
MAIN BLOCK A.

[To face p. 198.


"MOUNT VERNON HOSPITA
FOR CONSUMPTION, NORTHWOOD.
BLOCK PLAN
N
ENTRANCE
COOK'S ROOM
W.Cs.
BATH
BEDROOM
CUPD
SISTERS SITTING ROOM
SISTERS DINING ROOM
BEDROOM
COOK
LARDER
BREAD
GROCERY
CHINA & GLASS
WORK ROOM
HALL
ENTRANCE TO NURSES' HOME
PANTRY
NURSES SITTING ROOM
NURSES DINING ROOM
BLOCK D.
COVERED WAY
DOCTOR'S DINING ROOM
CUPD
PORTER
CARVING TABLE
HALL
COVERED WAY
HALL
W.C.
SAFE
WAITING ROOM
PANTRY
SECRETARY
SECTY'S OFFICE
BLOCK B.
GARDEN CHAIRS
MORTUARY
POST MORTEM ROOM
PATHOLOGICAL ROOM
DARK ROOM
Pathological Room, Mortuary Etc under Winter Garden
BLOCK
THE DRIV
MAIN HALL
PANTRY
DOCTOR'S BED Rm
VERANDAH
LINEN
LAVATORY & CLOAK ROOM
DOUCHE
H.M.C.
HOSPTL SINK
LIFT
NURSE'S KITCHEN
BATHS
ELECTRIC BATH
NURSE'S SITTING Rm
BATH & W.C.
CONSULTING ROOM
STAFF DINING ROOM
BATH & W.C.
CORRIDOR
WARD
WARD
LIFT
WARD
STORES
LINEN
MATRON'S SITTING Rm
SITTING ROOM
DISPENSARY
MEN'S ENTRANCE
SINGLE WARDS
TERRACE
GRAVEL WALK
BLOCK A.

[To face p. 19


OSPITAL"
RTHWOOD.
ST MORTEM
ROOM
LOGICAL
OM
OOM
cal Room,
Etc under
rden BLOCK A.
E DRIVE
BATH &
W.C.
WARD
MENS
ISOLATION
WARD
NURSE'S
KITCHEN
RES
LINEN
ARDS
WINTER
GARDEN

[To face p. 198.

adding much to the beauty of the building and affording considerable shelter to the terrace, serves as admirable protection for patients requiring rest, and a covered ground for exercise when tempestuous weather makes open-air life impossible. On the first floor of each wing are large recreation-rooms and well-fitted reading and writing rooms, and these and the wards on this floor open on to a wide balcony, where bed cases can be readily wheeled and enjoy an extensive view of the Thames Valley and the Surrey hills. There is a well-equipped dental room and two completely furnished electric baths.

On the north side of the Hospital proper is the residence of the Medical Superintendent, the ground floor of which contains the main entrance hall and various secretarial and other offices.

GENERAL VIEW OF THE MAIN BUILDING OF THE MOUNT VERNON HOSPITAL, NORTHWOOD, MIDDLESEX.

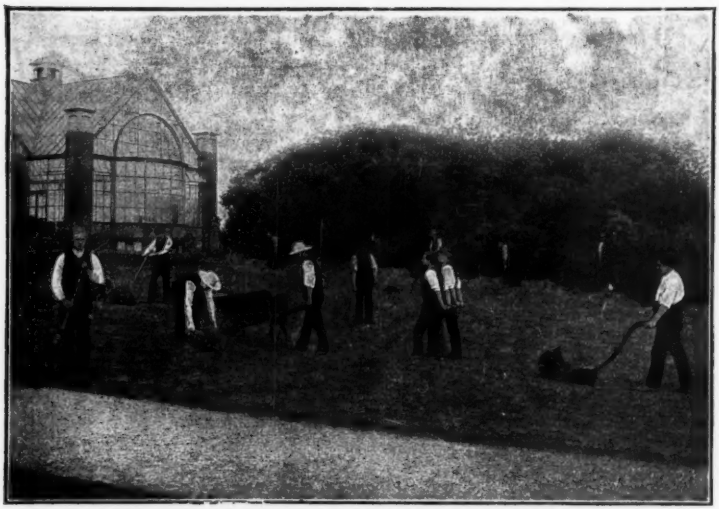
Behind this building, and facing west, is a spacious dining-hall capable of accommodating at least 250 people. Here the patients take their meals, being seated at small tables, so arranged as to be convenient for grouping of cases, and handy for serving.

The nurses' home and kitchens are situated still farther to the north and in alignment with the Medical Superintendent's residence and the dining-room respectively. All these blocks are connected with the Hospital proper by a corridor. The kitchens communicate with the dining-room by a separate corridor, and in designing this department the Committee have arranged that in the event of any extension being found to be desirable to the main building, it will not be necessary to enlarge either the kitchens, store-rooms, or the machinery department, the accommodation being above rather than below what is considered necessary for the requirements of the Hospital when working at its full

strength. In the kitchens everything is of the best and most modern type. The cooking apparatus is of the most recent design, and much of the cooking is done by steam. Sterilizers and refrigerating chambers have also been provided.

In the nurses' home provision has been made for twenty nurses, and on the ground floor, in addition to the entrance hall, is a large sitting-room, dining-hall, sisters' room, and four bedrooms, with pantry, linen-room, bath, and lavatory. Each nurse has her own bedroom.

The whole of these blocks are lighted by electricity generated in the electric light station, which lies to the north of the kitchen block. There is a pure and plentiful supply of water, which is obtained from



MEN PATIENTS AT WORK AT NORTHWOOD.

the chalk beds. There is also an efficient steam laundry. There is extensive equipment for dealing with any outbreak of fire.

A large and well-equipped pathological laboratory furnishes means for the scientific investigation of every case, and here, it is hoped, much valuable research work will be carried out which shall throw new light on the problems of consumption, and secure sound knowledge which shall extend our means for coping with other forms of chest disease.

Provision has also been made for the spiritual needs of the patients, a suitable chapel having been built in the grounds slightly to the east of the main building. The chapel is unique in its effective simplicity and quaint beauty. The interior decoration is entirely of oak.

The institution is in telephonic communication with the offices at 7, Fitzroy Square, London, and with all parts of the country.

This is not the place to deal with methods of treatment, but it may be permissible to say that the medical staff has arranged that the best results of scientific research will be freely placed at the service of every

patient. The nursing staff are specially selected to meet the particular requirements of the patients. The extensive estate at Northwood allows of plentiful opportunities for outdoor employment for those patients who may be fitted for light work. There are well-arranged paths in the grounds which afford abundant opportunities for exercise. The extensive grounds and the large and beautiful lawns supply all that is needful for insuring an enjoyable outdoor life. Every care is taken to insure sound education in hygienic methods. It will thus be seen that at Northwood the Committee have provided everything which modern science can suggest to facilitate the medical treatment and secure relief to the patients under their care. With the experience

WOMEN PATIENTS TAKING WALKING EXERCISE AT NORTHWOOD.

of the past forty years to guide them, the Committee of Management have succeeded in providing an institution which in every way appears to be eminently suitable for the purpose they have in view.

Further extensions are to be carried out in the immediate future. The accommodation for women is to be increased by the erection of a pavilion capable of taking fifty patients, and means are being sought to build a pavilion for the reception of children. The terms upon which patients are received are on a payment of 25s. per week, or at a reduced charge of 15s. if nominated by a governor of the Hospital. The Hospital is about a mile from Northwood Railway Station, on the Great Central and Metropolitan Railways. Cabs are always in attendance. Further particulars can be obtained on application to the Central Offices, 7, Fitzroy Square, London, W. (Telephone, Gerrard 5585).

W. J. Morton,
Secretary of the Hospital.

NOTICES OF BOOKS.

THE ARREST OF DISEASE.

STUDENTS of tuberculosis will be interested in Dr. Much's brochure.[1] It consists of seven lectures addressed to a lay public. Dr. Much seeks to educate his audience in the essentials of bacteriology and the principles of prophylaxis against infectious disease. The manifold problems of immunity are set forth and discussed in so lucid and trenchant a manner that a complex and difficult subject is invested with extraordinary interest. These lectures were given in Hamburg in the winter term 1911-12, and we think the Hamburg public has every cause to count itself singularly fortunate in having easy access to such an illuminating series of addresses on matters that vitally affect every living being, though a very small minority of living beings are in a position to probe deeply into their nature.

E. KANTHACK DE VOSS.

TUBERCULIN TREATMENT.

A year ago Drs. Riviere and Morland issued their manual on Tuberculin Treatment, which was duly reviewed in this journal.[2] The speedy call for a second edition affords abundant testimony to the merits of the book.[3] It is, in fact, the most reliable, complete, and helpful volume available on the subject. Since the issue of the first edition the authors have been impressed by the rapid increase in the use of tuberculin in institutions in the British Isles; and it may be safely stated that their book has done much to insure its administration in accordance with scientific principles and rational procedures. The opinion is expressed that in pulmonary cases, at least, there is danger in producing general reactions, and grave doubt whether focal reactions should be deliberately aimed at. The authors rightly urge the desirability of a uniform standard of measurement, and advocate the use of the cubic millimetre as unit; they also speak favourably of the new forms of albumose—free tuberculin. Every tuberculosis officer should possess and study this book.

[1] "Krankheitsentstehung und Krankheitsverhütung und geheimnisvolle Lebensäuszerungen des Körpers. Öffentliche im hamburgischen Vorlesungsgebände in den Wintern 1911 und 1912 gehaltene Vorlesungen." Von Dr. Hans Much, Oberarzt am Eppendorfer Krankenhause. Mit 22 Abbildungen im Text. Würzburg: Verlag von Curt Kabitzsch. Kgl. Universitäts-Verlagsbuchhändler. 1913. Price M. 2.50.

[2] See notice of first edition of "Tuberculin Treatment" in BRITISH JOURNAL OF TUBERCULOSIS, July, 1912, vol. vi., No. 3, p. 184.

[3] "Tuberculin Treatment," by Clive Riviere, M.D.Lond., F.R.C.P., Physician to the City of London Hospital for Diseases of the Chest, Victoria Park; and Egbert Morland, M.B. and B.Sc.Lond., M.D.Berne, Visiting Physician to the English Sanatorium, Arosa, Switzerland. Second edition. Pp. 262. London: Oxford Medical Publications, Henry Frowde, and Hodder and Stoughton. 1913. Price 6s. net.

THE TREATMENT OF TUBERCULOSIS.

Dr. Robin's monograph from the Therapeutic Clinic of the Paris Faculty of Medicine, at the Beaujon Hospital, endowed by the Duc de Loubat, is a volume which merits presentation in English form.[1] It is a comprehensive study of tuberculosis and its management particularly suited to the requirements of the general practitioner, but containing also much of interest and value for the expert. It is divided into six parts, dealing respectively with the soil of pulmonary tuberculosis and important indications as to treatment, hygiene and alimentation, treatment of pulmonary phthisis, treatment of tuberculosis according to age and to the associated morbid conditions, treatment of extra-pulmonary tuberculous affections and social defence against tuberculosis. Professor Robin holds original views which he sets forth with courage and conviction, although not without prejudice and, as many will think, imperfect evidence. He contends that the discovery of the tubercle bacillus has not ameliorated the treatment of the consumptive, and that "the best sanatorium cure is reduced to the application of a few disciplinary rules of hygiene and of diet." He further believes that "the exaggerated aptitude of an organism to absorb too much oxygen, to produce too much carbonic acid, and to become demineralized—that is to say, to carry on self-combustion—constitutes one of the elements of the soil prone to tuberculosis, whatever the generating origin of the soil: heredity, alcoholism, insufficient alimentation, various kinds of over-work." Many of Dr. Robin's hypotheses will appear extravagant and erroneous to English students, but it is well to remember that Great Britain has for long been under the dominance of German teaching in regard to tuberculosis, and has undertaken but little research work on her own account; and therefore we think it will not be without benefit if tuberculosis officers and others engaged in the diagnosis and management of tuberculous subjects in this country give careful, discriminating consideration to the views which are held by many experts in France, and ably presented in this suggestive and well-arranged monograph. A word of praise is due to the publishers for the excellence of the format of this handsome volume.

MANUALS FOR MEDICAL PRACTITIONERS AND WORKS OF REFERENCE.

In the diagnosis and treatment of tuberculosis, clinical skill must be associated with a knowledge of pathological methods. A laboratory is now an essential adjunct of every hospital and sanatorium. As a remarkably complete, reliable, and up-to-date textbook on practical methods, Dr. Besson's well-known work is unrivalled. All concerned in the introduction of this notable work, which in France is in its fifth edition, to English-reading students are to be congratulated. Dr. Hutchens, the translator and adaptor, has shown rare skill and discernment in the preparation of the English edition.[2] The volume

[1] "Treatment of Tuberculosis: Ordinary Therapeutics of Medical Men," by Albert Robin, Professor of Clinical Therapeutics at the Paris Faculty of Medicine. Translated by Dr. Léon Blanc, Physician at Aix-les-Bains. With the assistance of H. de Méric, Surgeon to the French Hospital, London. Pp. viii + 616. London: J. and A. Churchill, 7, Great Marlborough Street. 1913. Price 18s. net.

[2] "Practical Bacteriology, Microbiology, and Serum-Therapy (Medicinal and Veterinary)." A Textbook for Laboratory Use. By Dr. A. Besson, formerly Director of Bacteriological Laboratories of the Military Hospitals of France and of

opens with a detailed description of general technique, and then follow elaborate sections on the pathogenic bacteria, parasitic fungi, the pathogenic spirochætæ, the protozoan parasites, filtrable viruses, and, last, particulars regarding the application of bacteriological methods to the examination of water, sewage, and air. The chapter on the *Bacillus tuberculosis* extends to fifty-eight pages, and is particularly full and explicit; the various types are described in detail, the results of experimental inoculation are given, staining methods and cultural characteristics are fully explained, and a lucid account is provided of biological properties. The section on the detection of the tubercle bacillus will be invaluable to practical workers. The illustrations are admirable; indeed, the whole book is worthy of the highest praise, and should have a place in every laboratory.

Many claim tuberculosis to be a house disease, and argue with good reason that the extermination of this scourge of mankind will be impossible until greater attention is devoted to the designing, construction, and proper maintenance of hygienic habitations. A work of much practical service has just been issued by Mr. G. Gordon Samson, which will be of considerable help to medical advisers, sanitary experts, and all labouring for the improvement of the dwellings of the people.[1] The author is a pioneer and enthusiast in the de-slumming of cities, and seeks to stimulate Britishers to an enterprising self-help in the provision of hygienic homes. His new book affords precise and detailed directions regarding the planning and building of the house, and there are numerous excellent figures and plans. The book, as far as our experience goes, is unique. At a time when sanatoria are being extended, and many and varied forms of habitations are in course of preparation for tuberculous and tuberculously disposed subjects, it is just the book which every medical adviser will do well to study with care, for it provides such information and guidance as will assist him in a rational understanding of how he may helpfully co-operate with architect, builder, and sanitarian.

We have received from Mr. H. K. Lewis a new Pocket Case Book designed for the use of students and practitioners.[2] The book is neatly bound in limp cloth and the page measures 8 by 5 inches. It is arranged for twenty-five cases; four pages are allotted to each case, and the headings are arranged for the record of the usual particulars, including Personal History, Family History, and Present Condition. There are also diagrams for the marking of physical signs, space for diagnosis, prognosis, and extra space for the record of treatment and progress, including a miniature temperature chart, which should be very useful.

---

the Péan Hospital. Translated and adapted from the fifth French edition. By H. J. Hutchens, D.S.O., M.A., M.R.C.S., L.R.C.P., D.P.H., Heath Professor of Comparative Pathology and Bacteriology of the University of Durham; formerly an Assistant Scientific Investigator, Royal Commission on Tuberculosis. Pp. xxx + 892. With 416 illustrations, 149 of which are coloured. London: Longmans, Green and Co, 39, Paternoster Row, E.C. 1913. Price 36s. net.

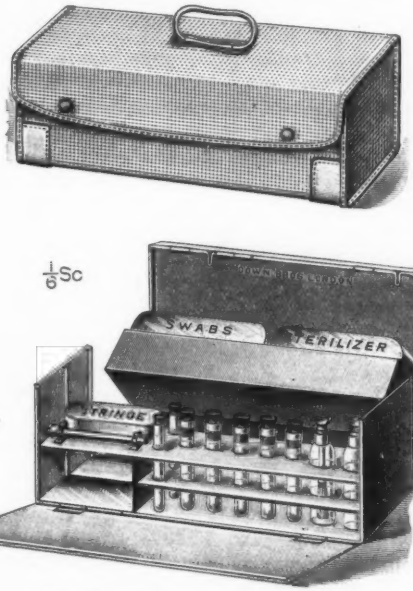
[1] "Every Man His Own Builder": A Book for Everyone who Owns a Piece of Land. By George Gordon Samson, Architect. Author of "How to Plan a House," etc. Pp. xi + 350, with 292 figures and plans. London: Crosby Lockwood and Son, 7, Stationers' Hall Court, Ludgate Hill, E.C. 1913. Price 5s. net.

[2] "Lewis's Pocket Case Book." Designed for the Use of Students and Practitioners. For twenty-five cases. Pp. 100. London: H. K. Lewis, 136, Gower Street, W.C. 1913. Price 1s. 6d. net.

PREPARATIONS AND APPLIANCES.

TUBERCULIN OUTFITS.

TUBERCULOSIS Officers and other medical officers using tuberculin will find the new TUBERCULIN OUTFIT suggested by Dr. E. H. R. Harries, the Tuberculosis Officer for the Newport and East Monmouth District under the King Edward VII. Welsh National Memorial Association, a most convenient and serviceable arrangement for facilitating dispensary and domiciliary work among tuberculous subjects.[1] As will be seen from the figures annexed, the "kit" is in a most portable



THE HARRIES TUBERCULIN OUTFIT.

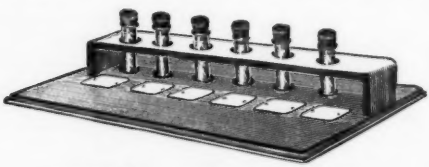
form. The outfit is contained in a case of block tin, aluminium-coated, measuring $12\frac{3}{4} \times 4\frac{3}{4} \times 3\frac{3}{4}$ inches. The lid, the front, and back of the case are hinged, and fold back flat on the table, leaving the central rack upstanding. The rack (fitted at one end with a tuberculin syringe in case and a von Pirquet scarifier) contains seven hard glass tubes with ground necks and rubber corks. Two of these tubes are of small

[1] Dr. Harries' Tuberculin Case is manufactured by Messrs. Down Bros., Ltd., 21 and 23, St. Thomas's Street, London, S.E.

size, and are intended for dilutions of old tuberculin for the von Pirquet test. The other five are used in various dilutions of tuberculin, one being kept filled with diluting solution. Each tube has a ground-glass area, upon which the contents can be written in pencil. For those who

SUMNER'S TUBERCULIN OUTFIT.

prefer it, gutta-percha tissue can readily be substituted for the rubber stoppers. In addition, a stoppered bottle fitted with a glass brush, and intended for collodion, and a second stoppered bottle for ether soap or alcohol, are provided in the rack. Slipping into the back of the case, and readily removable for use, are a complete sterilizer and a nickelled box to hold sterile swabs and cotton-wool. Thus the only thing that need be obtained at the centre is water. The various dilutions of tuberculin are, of course, made up at headquarters. The case and fittings are strongly made, and every care has been taken to provide a thoroughly reliable and complete equipment.



SUMNER'S TUBERCULIN DILUTION STAND.

Messrs. R. Sumner and Co. have also sent us illustrations of a TUBERCULIN OUTFIT which promises to be serviceable for Tuberculosis Officers.[1] The same firm have introduced a neat and effective stand for Tuberculin Dilution, designed by Dr. W. A. Daley, Medical Officer of Health for Bootle.[2]

Messrs. Burroughs Wellcome and Co. furnish us with particulars of a compact and thoroughly serviceable TUBERCULIN DILUTION OUTFIT.[3] It provides for the making in a few minutes, and under

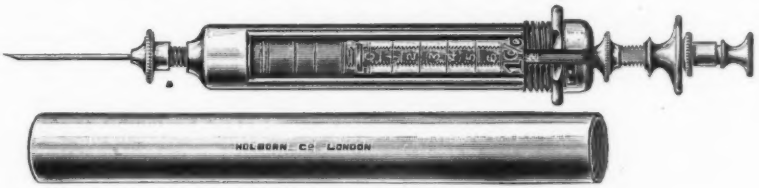
[1] Full particulars of the Sumner Tuberculin Outfit can be obtained from Messrs. R. Sumner and Co., 50a, Lord Street, Liverpool.

[2] The Daley Tuberculin Stand, made by Messrs. R. Sumner and Co., costs 6s. 6d.

[3] Full particulars regarding the outfit and the method of making the dilutions for use will be supplied on application to Messrs. Burroughs Wellcome and Co., 32, Snow Hill Buildings, Holborn, London, E.C.

thoroughly satisfactory conditions, of any required dilution of tuberculin. The equipment consists of a neat aluminized metal case, measuring $8\frac{3}{4} \times 2\frac{1}{2} \times 5\frac{1}{2}$ inches. Within is a polished metal rack fitted with holes, capable of supporting in an upright position sixteen bottles. The rack contains six bottles fitted with indiarubber stoppers, each marked with a single graduation of 10 c.c. Another smaller bottle occupies a receptacle on the extreme left, and is intended for the reception of the primary dilution. By means of a stout ring affixed to the centre the rack can be pulled out for sterilizing. The outfit also includes an accurately graduated pipette, a packet of "Tabloid" absorbent cotton, a 4-ounce bottle for saline solution, a small quantity of "Soloid" hexamethylene tetramine for burning, and a $\frac{1}{2}$-ounce stoppered bottle for antiseptic, etc.

A useful and inexpensive form of syringe for the administration of tuberculin, vaccines, and sera has been introduced by the Holborn



THE "HOLBORN" TUBERCULIN SYRINGE.

Surgical Instrument Company, Ltd.[1] The syringe screws into an aseptic metal cylinder, in which it can be kept in a sterile condition until required for use. The piston is made entirely of metal, and fits accurately into the glass barrel. The rod of the piston, as will be seen from the annexed figure, possesses an adjustable screw, allowing of the accurate regulation of the dose. The barrel and also the stem of the piston are graduated. The syringe is supplied with Schimmel's needles, and a spare needle is ingeniously fitted into the top of the piston-rod. This syringe will be of service to those using tuberculin in hospital and dispensary work, as well as for those who use tuberculin in private practice.

STEEL SAFES AND CABINETS.

Superintendents of sanatoria, dispensaries, and hospitals will do well to give heed to the safeguarding of important documents, clinical records, and valuable manuscripts. Fire, burglars, and other enemies of social and scientific welfare make it essential to provide adequate protective agencies. Milner's Safe Company, Ltd., have long been known as the manufacturers of particularly reliable fire-proof safes and strong-rooms. They have now introduced admirable keyless boxes made of seamless steel, which will be of particular service not only to the management of institutions such as hospitals, sanatoria, and open-air schools, but will be very useful to many patients undergoing

[1] The "Holborn" Tuberculin Syringe is supplied by the Holborn Surgical Instrument Company, Ltd., 26, Thavies Inn, Holborn Circus, London, E.C. Price 7s. 6d. to 12s. 6d. complete: with spare Schimmel needles, 1s. 6d. per tube of six.

open-air treatment and wishful of possessing some private receptacle for the safe and convenient storage of valuables. Milner's Steel Letter, Card, and Insurance Card Cabinets should be of special value in dispensary and domiciliary practice.[1]

THE UNDERCLOTHING OF THE TUBERCULOUS.

Physicians and patients pay too little heed to the important question of clothing. Both in the conduct of hygienic measures to prevent disease and the management of procedures to arrest disease the regulation of the underclothing is, generally speaking, either overlooked or insufficiently considered. During recent years excellent forms of sanitary underwear have been introduced. We have given special attention to the AERTEX CELLULAR CLOTHING, and after considerable experience and testing in all weathers, we have no hesitation in according it the highest praise.[2] It is an underwear which provides in the most convenient and comfortable forms hygienic garments suited to both sexes, all ages, every climate, and all sorts and conditions of health and disorder. Cellular clothing is particularly well adapted for tuberculous cases. It retains the natural warmth of the body, permits of the ready escape of perspiration, makes for an equilibrium in temperature, and also provides garments which are comfortable, free from irritation, easily washed, do not shrink, and are durable. We believe that patients, and indeed all classes of persons, who once give Aertex underwear a thorough trial, will be so convinced of its many advantages that they will continue both in summer and winter to clothe themselves in cellular garments. We have recently tested the AERTEX CELLULAR SHEETS which are peculiarly adapted to the requirements of tuberculous subjects and patients undergoing open-air treatment. They are light, warm, allow of the transmission of perspiration, do not give the sense of chill which comes from contact with ordinary cold sheets, and provide protection, comfort, and means for the maintenance of cleanliness in a way which will readily be recognized when a practical test is applied. We strongly recommend the Aertex Cellular Sheets for all classes of case, and particularly for tuberculous subjects.

EQUIPMENT FOR THE HOME AND THE SANATORIUM.

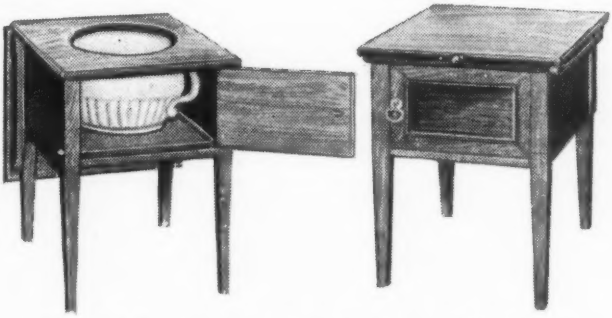
Much discomfort, suffering, or actual injury occurs from the use of improper or imperfect chamber utensils. Moreover, in private habitations, and also in public institutions, the unsightliness and inconvenience of commodes are well known. Physicians and patients will welcome the new form of PEDESTAL CUPBOARD recently introduced by Messrs. C. T. Fox and Co., and supplied by Messrs. John Barker and Co., Ltd.[3]

[1] Full particulars of the various forms of Steel Cabinets, Boxes, etc., may be obtained on application to Milner's Safe Company, Ltd., 28, Finsbury Pavement, London, E.C.

[2] An illustrated catalogue of Aertex Cellular Clothing, etc., may be obtained on application to the Managing Director, the Cellular Clothing Company, Ltd., 72 and 73, Fore Street, London, E.C.

[3] The Fox Registered Pedestal Cupboard is manufactured and patented by Messrs. C. and T. Fox and Co., 7 to 10, Eldon Street, London, E.C., and is supplied through the London agents, Messrs. John Barker and Co., Ltd., High Street, Kensington, London, W.

The chief points about this excellent and in every way most satisfactory hygienic contrivance are indicated in the accompanying illustration.



THE FOX REGISTERED PEDESTAL SANITARY CUPBOARD.

The well-known manufacturers of the "Currie Toys" have now introduced what they call "CURRIE CORNERETTES."[1] These are small triangular blocks or pyramids which fit into corners of rooms, cupboards, or stairs, and prevent the accumulation of dust. As these simple contrivances will make for hygienic righteousness we recommend them.

The promoters of the Kahn system of reinforced concrete have issued a booklet, with plan and illustrations, indicating how, by use of their HY-RIB SHEETING, sanatoria may be erected at a cost of £50 per bed.[2]

Now that everyone is preaching and practising open-air doctrines, ways and means, new and rational, are being introduced to meet the novel thoughts and hygienic needs of to-day. And nowhere are the effects of the new teaching more manifest than in the furnishing and equipment of gardens, country habitations, sanatoria, open-air schools, and other centres for the restoration or protection of health. Our attention has recently been directed to the artistic, comfortable, and inexpensive NATURE FURNITURE provided by Mr. J. E. C. Haigh.[3] The accompanying illustration gives some idea of the natural brown osier furniture, which we consider admirable for use in gardens and sanatoria. These constructions are strong, durable, stand exposure to weather well, are not hurt, but rather bettered by a wetting, and withal are pleasant to look at and pleasing in use. Moreover, they can be supplied at a comparatively low cost, the whole set here illustrated only costing 27s. 6d.

Persons who adopt open-air methods know that while the adoption of a hygienic manner of life is good for health, there are drawbacks

[1] The "Currie Cornerettes" are made by Messrs. Currie and Co., 3, Fulwood's Rents, Holborn, London, W.C. Price 3d. a dozen.

[2] A copy of the booklet may be obtained on application to the Trussed Concrete Sheet Company, Ltd., 5, Caxton House, Westminster, London, S.W.

[3] A full list of special designs in osier and hazel, suitable for use in sanatoria, can be obtained on application to the maker, Mr. J. E. C. Haigh, Station Place, Letchworth.

dependent on weather, the invasion of gnats, moths, and the like, and the attacks of other destructive agencies. For protecting furs and other garments from being moth-eaten, the new "MOTHORRA FUR SAFE" will be of the greatest service.[1] These safes have a thick inner-casing of prepared solid block carbon, and each is fitted with a new form of air-lock lid covered in attractive dark stamped leatherette. Patients in sanatoria will know how to appreciate these sensible protective boxes.

Although during summer days thoughts are not specially centred on grates and fuel, now is the time to prepare for the coming cold days

NATURAL OSIER OPEN-AIR FURNITURE.

of autumn and winter, so no apology is needed for drawing attention to the Houghton ADJUSTABLE GRATE.[2] By this simple, inexpensive, but ingenious contrivance old-fashioned fireplaces can in great measure be modernized with a minimum of outlay and without the employment of skilled labour, and, not being a fixture, the grate remains the property of the tenant. For patients undergoing open-air treatment in their own rooms a well-regulated fire is oftentimes not only a great comfort, but an aid to efficient ventilation, and the new adjustable grate will enable old-fashioned fireplaces to be effectively modernized.

The bedpan of bygone days possessed many disadvantages, judged both from the patient's and the nurse's points of view. The Meinecke "Perfection" BED AND DOUCHE PAN is for bed-fast patients the most satisfactory convenience yet introduced.[3] It is anatomically correct; it is comfortable, and cannot hurt the patient. The weight of the body rests on the side of the pan, thereby relieving all pressure on the spine. It has a large capacity, the standard size holding fully two quarts, whereas the ordinary bed-pans hold only about one quart or less. It can also be used as a douche-pan, the large opening above the back end permitting the nurse to easily reach the parts to which the douche or injection is to be applied. As far as we know, it is the only bed-pan that is really sanitary and can be quickly emptied and readily cleansed.

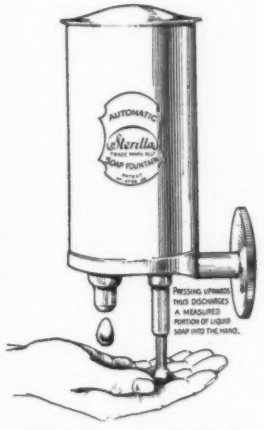
[1] The "Mothorra" Fur Safe can be obtained in a variety of sizes and varying in price from 3s. 11d. upwards. Full particulars will be supplied on application to Messrs. Derry and Toms, High Street, Kensington, London, W.

[2] The Houghton Adjustable Grate is manufactured by the Adjustable Grate Company, York Road, Ilford, Essex. Price 10s. 6d.

[3] Meinecke's "Perfection" Bed and Douche Pan is made in two sizes by Messrs. Grimwade, Ltd., Pottery Works, Stoke-on-Trent, which firm possesses the exclusive right to manufacture this appliance for Great Britain and her Colonies under patents granted to Messrs. Meinecke and Co., New York City, U.S.A.

There are no sharp corners and no spout. It is made of excellent material, and is highly glazed, non-porous, and can easily be rendered aseptic. This form of bed and douche pan should be found in all sanatoria.

In many hospitals, schools, sanatoria, and other public institutions it is very desirable, if strict sanitary conditions are to be maintained, to arrange that a strict watch is kept over the hygienic control of water, soap, and all cleansing materials. The introduction of the STERILLA AUTOMATIC SOAP FOUNTAIN[1] will go far to assist in the sanitary equipment and conduct of lavatories. The introduction of this simple but effective appliance marks a notable advance in sanitary equipment. This contrivance successfully accomplishes a long-desired reform in lavatory sanitation by providing a practical means of distributing soap in small portions to each user. The pattern shown in the illustration is made entirely of metal handsomely nickel-plated. The base is furnished with an adjustable measuring chamber, from which a definite quantity of liquid soap is discharged by the upward movement of a lever. This operation is exceedingly simple, the lever being pushed up by the fingers for the soap to fall into the palm of the hand. The fountain is characterized by efficiency, simplicity, compactness, and economy of working. It puts the finishing touch to the lavatories and bathrooms of well-kept establishments, and we commend this ingenious appliance to the attention of physicians, sanitarians, and all medical directors of sanatoria. Special forms of "Sterilla" soap are provided for use in the fountain. An effective liquid soap is available for dealing with cases of seborrhœa and other disorders of the hairy scalp which are met with in a large number of tuberculous patients, and particularly among children. Medical advisers of open-air and residential schools will do well to make a note of the "Sterilla" Soap Fountain and "Sterilla" soaps.



THE STERILLA AUTOMATIC SOAP FOUNTAIN.

In a recent issue of this journal (January, 1913) we referred to the various forms of hygienic clothing now provided in many varied and attractive shapes by Messrs. Burberrys. The following information, which has recently been received, affords additional proofs of the value of "Burberry" clothing for all open-air livers. Burberrys recently had an interesting display of the outfit they have provided for the Canadian Arctic Expedition, which in June last started, under the command of Mr. V. Stefansson, into the hitherto unexplored regions bounded by Behring Strait and the Pole, the Western border of the Arctic Archipelago and the known open sea north of Siberia. Following the example of Dr. Nansen, Mr. Wellman, Captain Jackson, the late Captain Scott, Sir Ernest Shackleton, Dr. Charcot, Captain Amundsen,

[1] The patentees of the "Sterilla" Automatic Soap Fountain are Messrs. Harold E. Matthews and Co., Clifton, Bristol, from whom full particulars may be obtained.

Mr. Stefansson, at the instance of the Canadian Government, which is financing the expedition, has relied on Burberrys for textile equipment. He took a large number of Gabardine and fleece suits, including gloves, and no less than six Gabardine tents, with enough of both materials in the piece to last for four years. It is a great tribute to the weather-resistance and durability of Burberrys' specially woven and proofed materials that practically all the great Polar explorers of the last twenty years should have been equipped with Burberry outfits, especially when it is remembered that life itself in these hazardous expeditions often depends on the strength and protective powers of clothing. "Burberry" clothing is excellent for patients undergoing open-air treatment.

A NOVEL HAND ICE MACHINE.

Messrs. Hannefords, Ltd., have invented a new form of HAND ICE MACHINE, which will be invaluable in sanatoria and other institutions where it is desirable to have ice available at short notice for administration to hæmoptoic and other cases.[1] Although originally designed for domestic use, this ingenious appliance will be of the greatest service in hospitals, hotels, on shipboard, and elsewhere. The "W.K." Hand Ice Machine is a model of reliability, economy, and efficiency. It is a necessity for those dwelling in hot climates, and it may be counted a luxury for people in every latitude. It is the result of many years of experiment, and the inventors have undoubtedly produced a machine which is a triumph of science. It makes pure ice in any temperature within the extraordinary brief space of three minutes. The machine is a light, compact, and strong apparatus, which works on the principle that water freezes when quickly evaporated by means of a vacuum-pump. Sulphuric acid, which is a powerful absorbent, is used in the working. A charge of acid, costing about sixpence and usable for hundreds of freezings, is the total working expenses. A few turns of the handle, which operates a pump for creating a vacuum, represents the mechanical side of the operation. The pump is a fine piece of mechanism, with ball bearings throughout, and the working parts are immersed in oil, thus reducing labour to a minimum. The Ice Machine is offered by the makers at a price within the reach of all. We strongly advise secretaries of hospitals and directors of sanatoria to look into this matter.

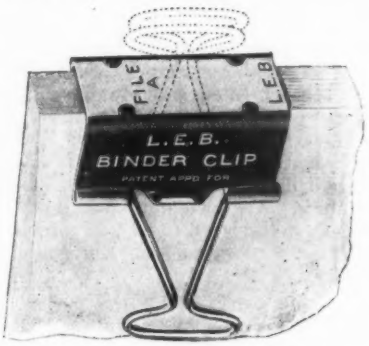
THE W.K. HAND ICE MACHINE.

REQUISITES FOR THE DOCTOR AND THE PATIENT.

From the varieties of stethoscope now available, it would seem as though physicians were difficult to satisfy, or that the ideal stethoscope

[1] An illustrated booklet descriptive of the construction and working of the "W. K." Ice Machine will be sent on application to the makers, Messrs. Hannefords, Ltd., 91 and 93, Queen Victoria Street, London, E.C.

was yet to be discovered. Perhaps it is not so much the stethoscope that is wanted as the hearing ear. Anyway, one of the simplest and best of stethoscopes with which we are acquainted is the WOODEN STETHOSCOPE with bell-shaped earpiece, designed by Dr. Graham Steell, and manufactured by Messrs. Wood and Blake.[1] We would advise tuberculosis officers to try this form of stethoscope, for we believe they will find it convenient, cheap, and effective.



THE L.E.B. BINDER CLIP.

Medical officers and secretaries of hospitals, as well as medical practitioners generally, will find the new L.E.B. "BINDER" CLIP, a figure of which is appended, most useful for the orderly grouping of case-papers, temperature, and other charts, letters, and the like.[2] The arms of the clip may be reversed and snapped flat against the papers, and when kept at the side papers are bound as it were in book form ready for easy reference. This simple, strong, cheap, and handy clip will be found a valuable auxiliary to all forms of filing systems.

In not a few cases of tuberculosis cardiac failure becomes one of the most marked dangers, and calls for prompt treatment. Among all modern methods of cardiac therapy the administration of digitalis still holds a foremost place, and one of the most convenient and effective ways in which this valuable agent may be given is in the form of Nativelle's CRYSTALLIZED DIGITALINE.[3] The small granules, each containing $\frac{1}{100}$ grain of the drug, insures accuracy and effectiveness, and provides a form which is not objected to even by the most fastidious of patients.

The Wander MALT EXTRACT Products are excellent for tuberculous subjects.[4] The new preparation of crystalline malt extract with iron iodide is palatable, stable, and non-irritating, and can be strongly recommended for administration to tuberculous children.

LECITHIN is proving of considerable benefit in the management of many forms of tuberculosis. Messrs. Squire and Sons have recently introduced several excellent Lecithin preparations.[5] Liquid Sibka is a

[1] The Graham Steell Stethoscope is made by Messrs. Wood and Blake, 78, King Street, Manchester.

[2] The L.E.B. "Binder" Clip is made by Messrs. Cushman and Denison Manufacturing Company, 240 to 242, West 23rd Street, New York, and can be obtained from the Gem Supplies Company Ltd., 67, Southwark Street, London, S.E.

[3] Specimens of Nativelle's Digitaline, with literature regarding its action, may be obtained on application to Messrs. Wilcox, Jozeau and Co., 49, Haymarket, London, S.W.

[4] Full particulars regarding the Wander Brand of Malt Extract Products may be obtained on application to A. Wander, Ltd., 1 to 3, Leonard Street, London, E.C.

[5] Full particulars regarding "Sibka" and the other Lecithin preparations may be obtained from the manufacturers, Messrs. Squire and Sons, 413, Oxford Street, London, W.

pure colloidal solution of lecithin with the glycerophosphates of calcium, potassium, and sodium, presenting a particularly efficacious method of administering this important phosphatide. Lecisol is a pure colloidal solution of lecithin containing 1 grain of lecithin in each fluid drachm. Sibka chocolettes provide a particularly attractive and agreeable method of administering the phosphatide in the form of a sweetmeat.

Messrs. Allen and Hanbury have made their "BYNO" PREPARATIONS famous in all parts of the Empire, and they have now added to the series "BYNO"-LECITHIN.[1] This is an elegant pharmaceutical preparation in which lecithin is effectively combined with Bynin, pure active liquid malt, together with the alkaloids of cinchona and nux vomica. We have employed this preparation with much satisfaction. It is a digestive, a tonic, and a food, and will be found of much service in improving nerve tone and general nutrition in many cases of tuberculosis.

An excellent form of handkerchief of paper chiffon, suitable for use by tuberculous patients, has long been in use under the name of "Toinoco" silky fibre ASEPTIC HANDKERCHIEFS, and can be strongly recommended to consumptive subjects and others suffering from infectious catarrhs, or discharges from the nose and throat. They are very soft and absorbent, and quite agreeable to use. A new and stronger form of "Papier Crepon" has recently been introduced, and will be found effective in sanatoria and hospital practice.[2]

[1] Messrs. Allen and Hanbury, Bethnal Green, London, E., will send specimens of "Byuo"-Lecithin and full particulars of their Byno preparations on application.

[2] Samples and particulars of the "Toinoco" Silky Fibre Aseptic Handkerchiefs and the "Toinoco" Papier Crepon can be obtained on application to the makers, Messrs. J. T. Powell and Co., 3, Unity Street, Bristol.

NOTES.

A NATIONAL TUBERCULOSIS CONFERENCE.

The Fifth Annual Conference of the National Association for the Prevention of Consumption and Other Forms of Tuberculosis, of which His Majesty the King is Patron, and the Right Hon. the Lord Balfour of Burleigh, K.T., G.C.M.G., Chairman of Council, with Sir Robert W. Philip, M.D., F.R.C.P.E., F.R.S.E., as Vice-Chairman of Council, will be held at the Central Hall, Westminster, London, S.W., on August 4 and 5. This date has been chosen on account of the International Medical Congress meeting in London in August, which will be largely attended by leading physicians from abroad. A number of these distinguished visitors, as well as British experts, have expressed their intention of taking part in the Association's Conference. The Prime Minister (the Right Hon. H. H. Asquith) has marked his sense of the importance of the occasion by kindly consenting to open the Conference. The Council has spared no effort to secure powerful support, and confidently expects that the Fifth Annual Conference of the Association will be even more successful and interesting than those held in previous years. The Conference will be divided into four Sessions on two days. The programme will be as follows: (1) August 4, morning and afternoon, Tuberculin Treatment; (2) August 5, morning and afternoon, The Necessity for the Co-ordination of Anti-Tuberculosis Measures. These subjects have been selected as being especially adapted to the needs of the hour. In regard to Section I. it may be noted that every aspect of the therapeutic value of tuberculin will be considered—viz., the special indications for, and the limitations to, its use; its value in sanatorium and dispensary treatment; the extent of its field of usefulness in the different classes of cases. The Council feel that the experience of eminent experts from other countries where tuberculin has been widely used will be found of value. The Introductory Address to this discussion will be given by Dr. Hector W. G. Mackenzie. Section II. will deal with the co-ordination of anti-tuberculosis measures. Following the lines which were found to be so successful in the Annual Conference at Manchester last year, this Section will take the form of a public discussion thrown open to all delegates, and preceded by an Introductory Address. The Council feel strongly that a complete scheme should be put in force in each district —no link in the chain of protection being omitted. It is believed that an interchange of views among those who have to frame the measures to be adopted under the National Health Insurance Act must tend to promote the uniformity and completeness which are so much to be desired. The discussion will be opened by Sir Robert W. Philip, M.D., of Edinburgh, where a co-ordinated scheme has been in operation for a number of years. In addition to the discussion it is proposed to have special demonstrations, illustrated by the cinematograph. It should be added that all speeches in the course of the discussions will be in

English. The complete programme, with full details of speakers and subjects, may be obtained on application to the Hon. Secretary, Dr. J. J. Perkins, 20, Hanover Square, London, W.

TUBERCULOSIS AND MEDICAL RESEARCH.

This Journal has consistently advocated and has constantly worked for the establishment of a Tuberculosis Bureau and the institution of a representative Body which should initiate and direct research into the many problems connected with Tuberculosis. At last there seems a probability of our dreams being fulfilled. The Chancellor of the Exchequer has appointed a Committee, with executive functions, to be known as the Medical Research Committee, whose duties will be to direct, control, and correlate investigation of the ætiology, pathology, and other aspects of tuberculosis. The following are the members of the Medical Research Committee: The Right Hon. Lord Moulton of Bank, LL.D., F.R.S. (Chairman); Christopher Addison, M.D., F.R.C.S., M.P.; Waldorf Astor, M.P.; Sir T. Clifford Allbutt, K.C.B., M.D., F.R.C.P., F.R.S., Regius Professor of Physic, University of Cambridge; Charles John Bond, F.R.C.S., Senior Honorary Surgeon, Leicester Infirmary; William Bulloch, M.D., F.R.S., Bacteriologist to the London Hospital and Professor of Bacteriology in the University of London; Matthew Hay, M.D., LL.D., Professor of Forensic Medicine and Public Health, Aberdeen University; Frederick Gowland Hopkins, M.B., D.Sc., F.R.S., Reader in Chemical Physiology in the University of Cambridge; and Brevet Colonel Sir William Boog Leishman, M.B., F.R.S., Professor of Pathology, Royal Army Medical College. There is also to be a further body, the duties of which will be to consider the scheme of the Medical Research Committee and to provide criticisms and suggestions. The membership of this Advisory Council for Medical Research is as follows: The Right Hon. Lord Moulton of Bank, LL.D., F.R.S. (Chairman); Miss L. B. Aldrich-Blake, M.D., M.S.; Sir W. Watson Cheyne, Bart., C.B., F.R.C.S., F.R.S.; Sir William S. Church, Bart., K.C.B., M.D.; Sidney Coupland, M.D.; David Davies, M.P.; Sheridan Delépine, M.B.; Sir James Kingston Fowler, K.C.V.O., M.D.; Sir Rickman J. Godlee, Bart., F.R.C.S.; Sir Alfred Pearce Gould, K.C.V.O., F.R.C.S.; David Hepburn, M.D.; Arthur Latham, M.D.; Sir John McFadyean, M.B.; W. Leslie Mackenzie, M.D.; J. C. McVail, M.D.; W. J. Maguire, M.D.; S. H. C. Martin, M.D., F.R.S.; Robert Muir, M.D.; Alexander Napier, M.D.; Sir George Newman, M.D.; Arthur Newsholme, C.B., M.D.; J. M. O'Connor, M.B.; Sir William Osler, Bart., M.D., F.R.S.; A. C. O'Sullivan, M.B.; Marcus S. Paterson, M.D.; Sir Robert W. Philip, M.D.; Sir William H. Power, K.C.B., F.R.C.S., F.R.S.; H. Meredith Richards, M.D.; Lauriston E. Shaw, M.D.; Albert Smith, M.P.; J. Lorrain Smith, M.D., F.R.S.; T. J. Stafford, C.B., F.R.C.S.I.; T. H. C. Stevenson, M.D.; Harold J. Stiles, F.R.C.S. Edin.; Sir Stewart Stockman, M.R.C.V.S.; W. St. Clair Symmers, M.B.; Miss Jane Walker, M.D.; Norman Walker, M.D.; J. Smith Whitaker, M.R.C.S., L.R.C.P.; Sir Arthur Whitelegge, K.C.B., M.D.; and G. Sims Woodhead, M.D. The Chancellor of the Exchequer and the whole nation are to be congratulated on the appointment of such representative and advisory bodies.